A Contingency Theory-based Investigation of the Role of Management Accounting Information in Management Control Systems in Large Manufacturing Companies in Libya

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Abstract

In an attempt to provide a better understanding of the design and use of effective management control systems (MCS) in a developing country, this research study adopts a contingency theory approach to investigate the role of management accounting information (MAI) in facilitating MCS in large manufacturing companies. Drawing the relevant literature on contingency theory, a framework is developed and forms the basis for investigating the possible influence of several contingent variables, including centralisation, formalisation, environmental uncertainty, manufacturing complexity and competitive strategy, on the effectiveness of MCS as well as the potential mediating effect of the usefulness of MAI on these relationships.

Based on the findings of a questionnaire-based survey of 54 large manufacturing companies from different industrial sectors in Libya, this study identifies the role of MAI in facilitating MCS in these companies in terms of the four dimensions of scope, timeliness, aggregation and integration. Descriptive and inferential statistical tools are used to analyse the collected data, including independent t-test, correlation, simple and multiple regression. The study also utilises the Preacher and Hayes's (2004) macro through the SPSS package to investigate mediation regression effects in the MAI/MCS relationship.

The results of the descriptive analysis show that more bureaucratic MCS types - characterised as formal, tight, and impersonal controls - have been adopted in large manufacturing companies in Libya to motivate, control and direct different activities. In terms of competitive strategy, no pure cost leaders or differentiators were found; rather the responding companies consider various aspects of cost leadership and product differentiation priorities when shaping their competitive strategy. Apart from manufacturing process complexity, all other contingent variables studied were found to have a significant positive influence on MCS effectiveness in these manufacturing companies.

Although each of the four MAI dimensions (i.e. scope, timeliness, aggregation, and integration) explored in this study was perceived useful in relation to planning and problem solving activities, it is the aggregated information that was perceived the most important, available, and, thus, useful information. Very importantly this study found that MAI usefulness accounts for a full (i.e. complete) mediation effect only on the relationship between centralisation and MCS effectiveness, while it accounts for a partial mediating role on the relationship between MCS effectiveness and the other three contingent variables of formalisation, environmental uncertainty, and competitive strategy. On the other hand, the usefulness of MAI transmitted the influence of manufacturing process complexity on MCS effectiveness indicating an indirect effect instead of a mediated relationship. The latter is a significant distinction not usually made in previous studies that examined interaction factors.

Thus, this study contributes to the knowledge in this important area by distinguishing between mediation and indirect effects, in particular, and between full and partial mediation effects, in general. Finally, the main limitations of this study are outlined and opportunities for future research are suggested, particularly in relation to considering the moderating effect of a fourth variable on the mediation relationship (i.e. moderated mediation) in the interplay between MAI and management control system design and use.

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List of Abbreviations

MCS	Management control systems
MAS	Management accounting systems
MAI	Management accounting information
MAP	Management accounting practice
PEU	Perceived environmental uncertainty
TU	Task uncertainty
TQM	Total quality management
JIT	Just-in-time
FMS	Flexible manufacturing system
SBU	Strategic business unit
CEOs	Chief executive officers
ABC	Activity based-costing
TMTs	Top management teams
LOC	Locus of control
ROS	Return on sales
ROI	Return on investment
H	Hypothesis
SWOT	Strengths, weakness, opportunities and threats
VCA	Value chain analysis
Min	Minimum
Max	Maximum
S.D	Standard deviation
B	Unstandardised coefficients
S.E	Standard error
USMAI	Usefulness of MAI
MCSEFC	MCS effectiveness
CENT	Centralisation
FORM	Formalisation
ENUC	Environmental uncertainty
MAPCX	Manufacturing process complexity
CMSTG	Competitive strategy

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

((نَرْفَعُ دَرَجَاتٍ مَنْ نَشَاءُ وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ))

صدَقَ الله العَظِيم ــ سورة يوسف ــ آية 76

In the name of Allah, Most Gracious, Most Merciful

"We raise to degrees (of wisdom) whom we please: but over all endued with knowledge is one, the All-Knowing"

The Holy Quran, Surah Yusuf [Joseph], Verse 76.

Dedication

I wish to dedicate this study to:

My beloved mother and father;

My wonderful brothers:

Osama

Hatem

Mohamed

My dearest spouse Sumya and

My beautiful kids:

Maryam

Ramadan

Alfetori

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Chapter One
Introduction and Background

1.1 Introduction

This chapter aims to provide a general introduction to the thesis. It starts with theoretical considerations and background in the next section. The rationale and significance for undertaking the study is highlighted in section 1.3, followed in section 1.4 by the research aim, objectives, and questions. The research methodology and theoretical framework are presented in sections 1.5 and 1.6 respectively. In the final section, the thesis structure is outlined.

1.2 Theoretical Considerations and Background to the Present Study

1.2.1 Theoretical Considerations

Continuous changes in the business environment in general, and the nature of competition and manufacturing technology in particular, have put a lot of pressure on management across industries to cope with and adapt to these changes. As a key internal source of information (Emmanuel et al., 1991), management accounting has been called upon to play a more prominent part in the new and ever more competitive business environment by providing managers with much needed relevant and timely information that enables them to make appropriate decisions that meet and exceed expectations while taking advantage of emerging opportunities (Chenhall and Langfield-Smith, 1998a, Yazdifar, 2003, Drury, 2008).

In today's business environment, to achieve competitive advantages and to ensure high performance, companies need to emphasis particular strategic priorities and support these with appropriate organisational tools such as accounting information systems (Chenhall and Langfield-Smith, 1998c, Jermias and Gani, 2004). Thus, some management accounting authors (e.g. Dent, 1990, Simons, 1995) make a strong claim about the importance of the design and use of management accounting systems (MAS) to support managers in implementing organisational strategies. Moreover,

other authors (e.g. Shank and Govindarajan, 1993) stress the role that MAI can play in formulating, communicating, developing and implementing strategies, and monitoring the success of the implementation steps to meet the organisation's desired goals.

In this respect, the contingency theory approach of MAS is hypothesized that there is no universally appropriate accounting system which applies equally to all organisations in all circumstances. It assumes that the effective design of MAS depends on its ability to adapt to changes that appear in the surrounding external and internal circumstances of the organisation. In other words, for a MAS to be an effective system it needs to accommodate changes in the organisational contextual variables (Waterhouse and Tiessen, 1978, Otley, 1980, Emmanuel et al., 1991, Haldma and Lääts, 2002, Gerdin and Greve, 2004).

In the management accounting literature, several contingency factors have been identified and studied in relation to the design and use of MAS, for example *environmental uncertainty* (Baines and Langfield-Smith, 2003, Henri, 2006, Widener, 2007, Abdel-Kader and Luther, 2008), *manufacturing technology* (Waterhouse and Tiessen, 1978, Baines and Langfield-Smith, 2003, Abdel-Kader and Luther, 2008), *organisational size* (Davila., 2005, Henri, 2006), *organisational structure* (Abdel-Kader and Luther, 2008) *and strategy* (Abernethy and Brownell, 1999, Auzair and Langfield-Smith, 2005, Davila., 2005, Naranjo-Gil and Hartmann, 2006, Kober et al., 2007, Widener, 2007, Abdel-Kader and Luther, 2008). Langfield-Smith (1997) noted the emergence of literature on the role of strategy as an important contingent variable, which Otley (1999, p. 367) emphasises by saying "a central contingent variable is the strategy and objectives that an organisation decides to pursue".

However, the importance and relevance of strategy as a contingency variable become more apparent when they are looked at in relation to MCS [1], which is the wider organisational setting that encompasses MAS. The link between strategy and MCS is strongly emphasised by not an insignificant amount of recent literature (Chenhall,

[1] A management control system (M CS) is the process which helps managers ensure that organisational strategies and plans are implemented (Anthony and Govindarajan, 2007, Merchant and Van der Stede, 2007).

2003). The reason for this is that strategy is "… somewhat different from other contingency variables. In a sense it is not an element of context, rather it is the means whereby managers can influence the nature of the external environment, the technologies of the organisation, the structural arrangements and the control culture and the MCS. The role of strategy is important as it addresses the criticism that contingency-based research assumes that an organisation's MCS is determined by context and that managers are captured by their operating situation" (Chenhall, 2003, p. 150). In addition, the author describes the role of strategy as a dynamic one and this would lead managers to concentrate and assess the way that environment uncertainty, technology, and structure combine together to improve organisational performance.

1.2.2 Background to the Present Study

The points raised above are equally true regardless of geographical location as the globalisation of capital markets, increasing international competition and the economic growth in less-developed countries have also emphasised the important role that MAI can play in development issues (e.g. governance, planning, employment and life quality) and, therefore, increased the demand for such information (Jaruga and Ho, 2002, Hopper et al., 2009). The present study examines in detail the role of MAI in the design and use of MCS in large manufacturing companies in Libya, a country that has been undergoing rapid transformation since the mid-1980s and whose emerging economy presents a rich terrain for the study of accounting change.

Although the Libyan economy has until recently been described as a socialist-oriented economy, several steps have been taken by the State since the late 1980s and more so recently, to allow individuals to take part in the national economy and to privatise the State-owned (public) business organisations in an attempt to gradually move the Libyan economy towards a market economy. Examples of these steps include attracting and encouraging foreign investments, encouraging the private ownership of economic activities, reducing the role of the State to be limited in few public activities such as health, education and security, and privatising State-owned interests and liquidating those unprofitable business units. The sudden events in early 2011 which have now resulted in regime change may affect the way to go forward, for example by

accelerating the transition process and, therefore, accentuating the managerial needs and the role of MCS even further.

Accounting education and practice are largely attributed to American and British influence, initially when the country was under foreign administration from 1943 to 1952, and then through knowledge transfer by foreign oil and non-oil firms from late 1950s to early 1970s, and finally through accounting services provided after independence to Libyan firms and governmental organisations. It should be added that British accounting education programmes were particularly present in Libya from 1957 to 1976 and, where, to some extent, superseded by the American programmes and textbooks after 1976. Therefore, it can be said that the British and American accounting education systems and the practices of their private sectors have had the most influence on the current accounting education system and accounting practices in Libya (Ahmad and Gao, 2004).

The management accounting systems of the companies operating in the condition of transition should, in theory at least, provide adequate information to help managers at different responsibility levels take the right decisions. Although, some research studies (e.g. Anderson and Lanen, 1999, Jaruga and Ho, 2002) claim that traditional management accounting techniques are still widely used and perceived to be very beneficial, nonetheless a certain degree of sophistication in management accounting may be required for companies to be able to meet the challenges and the changes in business environment.

However, there is not much known about MCS in Libyan organisations. The research effort so far seems to be limited to studying management accounting practices (MAPs) only (e.g. Abulghasim, 2006, Alkizza, 2006, Leftesi, 2008, Abugalia, 2011). Therefore, this research project seeks to give a more encompassing perspective of MAI by examining it in relation to MCS which, as ‘organisational routines and practices’ (Scapens, 1994) are a better conduit for this type of research activity (Otley, 2008).

1.3 Research Rationale and Significance

Relevant research (e.g. Chenhall, 2007, Langfield-Smith, 2007) has revealed a strong inherent relationship between MCS and strategy, although MCS have been investigated in different aspects in terms of financial or non-financial controls.

Langfield-Smith (1997, 2007) has stressed the dynamic role of MCS in influencing strategy formulation, implementation, and strategic change. A number of studies have highlighted the role of MAI in this relationship. For instance, Abernethy and Brownell's (1999) found that organisational performance depend on the interactive and diagnostic use of budgets by top managers when their organisations experienced changes in product market. Similarly, and more broadly, Naranjo-Gil and Hartmann (2006) concluded that different ways of using MAI (i.e. interactive, diagnostic), for decision making and control in relation to strategic policies, by top management teams may affect different parts of the overall strategy, and emphasised the importance of MAS in strategy implementation. In contrast, Bhimani and Langfield-Smith (2007) found that the activities of strategy development and execution were relatively structured and formal, and both types of information (financial vs. non-financial) were important for strategy formulation and implementation. However, the emphasis was greater on financial than on non-financial information for strategy implementation in large UK companies.

While most of previous studies of MCS / strategy (e.g. Simons, 1987, Govindarajan, 1988, Bruggeman and Van der Stede, 1993, Chenhall and Langfield-Smith, 1998a, Hoque, 2004, Abdel-Kader and Luther, 2008, King et al., 2010) have conceptualised MCS from an accounting perspective, the omission of non-accounting mechanisms has received a lot of criticism as it led to the under-specification of an organisation's MCS (Chenhall, 2003). In this regard, Langfield-Smith (2007, p. 755) emphasised that for an effective design of MCS, these systems should not be restricted to only accounting mechanisms and should be considered in a more comprehensive view. She stated that

> "The orientation toward accounting controls and accounting information, which dominated much of the MCS research up to the mid-1990s, was found to be not sufficiently broad to capture more contemporary approaches to effective control".

On the other hand, contingency theory has a long tradition and has been adopted in most MCS studies to investigate the relationship between contingent factors and different aspects of MCS. However, calls for additional effort have been made to unravel the complexities of this relationship (e.g. Gerdin and Greve, 2004, Gerdin, 2005, Tillema, 2005, Chenhall, 2007), particularly in developing countries (e.g. Waweru et al., 2004, Hopper et al., 2009). This implicitly may indicate that previous research does not appear to give a clear picture of the relationship between MAS/MCS and strategy probably due to the narrow conceptualisation of MCS, either by focusing on one aspect of management accounting techniques (e.g. budget) or on the style of use by managers (e.g. interactive, diagnostic) and, in some occasions, the employment of overly simplistic contingency models to try and explain these complex relationships.

Although many contingent variables have been examined in the MAS/MCS literature, only few of them were found to be relatively popular, e.g. *environmental uncertainty, organisational structure, technology, and competitive strategy* (Chenhall, 2007). Thus, following the suggestions that more inclusive effort is needed in this research when utilising a contingency theory model (e.g. Fisher, 1995, Chenhall, 2003, Hopper et al., 2009), the following contingent variables in addition to competitive strategy are included in this research model; centralisation, formalisation, environmental uncertainty and manufacturing process complexity.

With respect to competitive strategy, this study has adopted and adapted Porter's (1980) typology of generic competitive strategies (i.e. cost-leadership, differentiation and focus). Although Porter's typology, as pointed out by Abdel-Kader and Luther (2008), is not significantly different from other competitive strategy typologies such as those developed by Miles and Snow (1978) and Gupta and Govindarajan (1984), it is the most present in recent relevant literature on strategy and MCS (see Chapter Three, Table 3.2). Firms in less developed economies, such as Ghana, that follow

differentiation strategies usually focus on many dimensions at the same time such as image, quality, level of service and gaining customer loyalty (Acquaah and Yasai-Ardekani, 2008, Amoako-Gyampah and Acquaah, 2008). This is unlike firms in developed economies such as the USA, where it is possible to apply Porter's typology almost unaltered, essentially examining the role of cost leadership or differentiation one at a time. In an emerging economy, however, as in the case of Libya, which does not offer comparable 'ideal' conditions of the strong and mature economy, Porter's model requires adjusting to make it usable in such context. Hence, for the purpose of this study, the generic strategies are examined separately as well as a combined variable. Such approach has already been successfully applied by a number of relatively recent studies (e.g. Chenhall and Langfield-Smith, 1998c, Auzair and Langfield-Smith, 2005). It is therefore assumed that companies following cost leadership priorities and those that follow product differentiation priorities may differ in terms of strategy formulation process, types of MCS used and perceived usefulness of MAI (see Figure 1.1, Panel A).

As mentioned earlier, MAS are part of organisational control systems and an important information source. In contrast, an MCS is described as a tool managers use to implement strategy. It is therefore assumed that there is a relationship between MAI and competitive strategy, as well as other organisational variables, and this is reflected in the workings of the MCS (see Figure 1.1, Panel B and C in Section 1.6 below). Hence, in the light of relevant literature, the present study focuses on some of these complexities through a multi-variable contingency model and examines the potential influence of organisational variables on the effective design and use of MCS in large manufacturing companies in Libya, paying particular attention to the role of MAI in this context. The selection of the Libyan context as the research setting is due to the limited evidence about the relationship between MCS and strategy, and role of MAI on this relationship, in this country, and because it was possible to obtain data, as it is the researcher's home country.

1.4 Research Aim, Objectives and Questions

As explained in the previous sections, this study aims to examine the role of MAI, from a contingency theory perspective, in facilitating MCS in large manufacturing companies in Libya.

To meet the above aim, the following four objectives are set for this research study:

1. To identify the strategy formulation process in large manufacturing companies in Libya, and the role of MAI in this process.
2. To identify the perceived usefulness of MAI in these companies.
3. To identify the types of MCS, their relationship with competitive strategy and effectiveness in these companies.
4. To examine the relationship between contingent variables and the effectiveness of MCS, and the role of MAI usefulness in these relationships.

To achieve the above objectives, this study attempts to answer the following research questions:

1. How do companies formulate their intended strategies?
2. What is the role of MAI in relation to cost leadership priorities?
3. What is the role of MAI in relation to differentiation priorities?
4. How do managers perceive MAI usefulness in these companies?
5. What types of MCS are used in these companies, how are they influenced by competitive strategy, and how effective are they?
6. How do contingent variables affect MCS effectiveness, and does MAI usefulness mediate these relationships?

1.5 Research Methodology

For the purpose of this research, and based on an extensive review of the relevant literature, care is taken to ensure a wider understanding of the variables that influence MCS and also to enhance the validity and reliability of the (contingent) variables measured. In this regard, the variables that possibly influence the design and use of MCS are identified from, and informed by, the existing relevant literature and then adapted to the Libyan context.

Five organisational variables, including two aspects of organisational structure (centralisation and formalisation), environmental uncertainty, level of manufacturing process complexity, and, most importantly, organisational strategy, which are assumed to have a potential influence on the effective design and use of MCS, are adopted for this study. Two forms of contingency fit approaches are drawn and adopted from the literature and previous studies in order to develop the research questions and hypotheses. They are the *Selection fit* approach and the *Interaction fit* approach.

According to Creswell (2009) the adoption of a specific research paradigm is influenced by the research problem, experience of the researcher, and the audience for whom the researcher seeks to report. For the design of this study, the positivism paradigm underpins this study and it is based on the deductive approach, since the research hypotheses are developed from the literature of contingency theory and MAS/MCS. The study hypotheses were eventually tested using quantitative data and appropriate statistical packages.

The questionnaire survey technique is considered to be the most widely used by empirical studies in the social sciences to explore and describe the interrelation of variables (Roberts, 1999). Thus, this technique has been chosen as the main method for data collection to attain the aim and objectives of this study. The research questionnaire is informed by relevant literature and thus draws and adapts questions from previous studies, as well as devising new ones as appropriate. The questionnaire consists of six sections; each section containing a number of questions related to a particular research issue. The first and second sections were devoted to gather general information on the respondents (job, academic qualifications and experience) and the surveyed companies (industry type, company's age, and ownership type) respectively. The third section focuses on the choices and process of strategy formulation. The fourth section was about the organisational variables. The fifth section aimed at collecting information related to the determinants of a successful MCS design, types of MCS, and organisational success and the effectiveness of company's MCS. The final section asks questions about the importance as well as availability of MAI in the sampled companies.

The translated questionnaire of the final English version was distributed to top managers in 60 large manufacturing companies in Libya during the period June to late August 2010. A total of 58 questionnaires were received, however 4 of them were excluded as they were unusable/partially completed yielding a total of 54 usable questionnaires (90% response rate). The last section of the questionnaire was designed to ask respondents to fill their contact details if they were willing to be interviewed after returning the completed questionnaire. Although no respondent offered to be interviewed, it was planned to renew contact with all respondents at a later stage once an initial analysis of the questionnaires was done. However, this plan had to eventually be abandoned because of the sudden turn of events in Libya in early 2011 and the ensuing war. The questionnaire was piloted prior to the distribution process, and issues related to the validity and reliability of the study's instrument was considered. Descriptive statistics (e.g. means and percentages) and advanced statistical tests (e.g. independent t-test, simple as well as mediation regression) were utilised to analyse the collected data using the SPSS statistical package.

1.6 Research Theoretical Framework

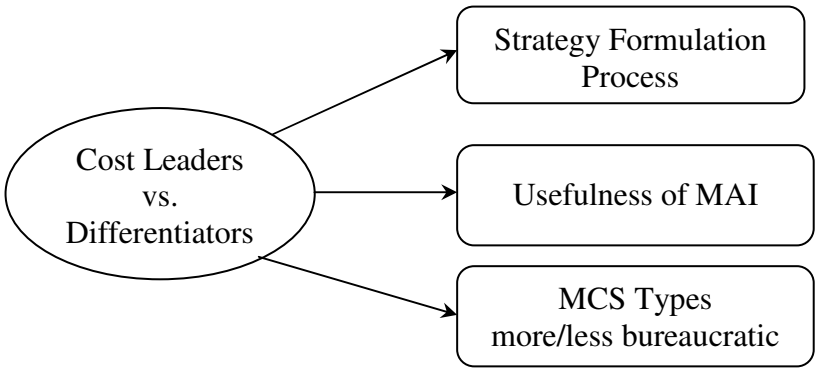
As can be seen from Figure 1.1, the research framework consists of three panels. Panel A identifies the possible differences that could be exist between cost leader companies and differentiator ones in terms of the strategy formulation process, usefulness of MAI and MCS types.

Panel B represents the first level contingency relationships, which focuses on the possible influence of five contingent variables, namely centralisation & formalisation, environmental uncertainty, manufacturing process complexity and competitive strategy, on MCS effectiveness. This first level stands for the Selection fit approach.

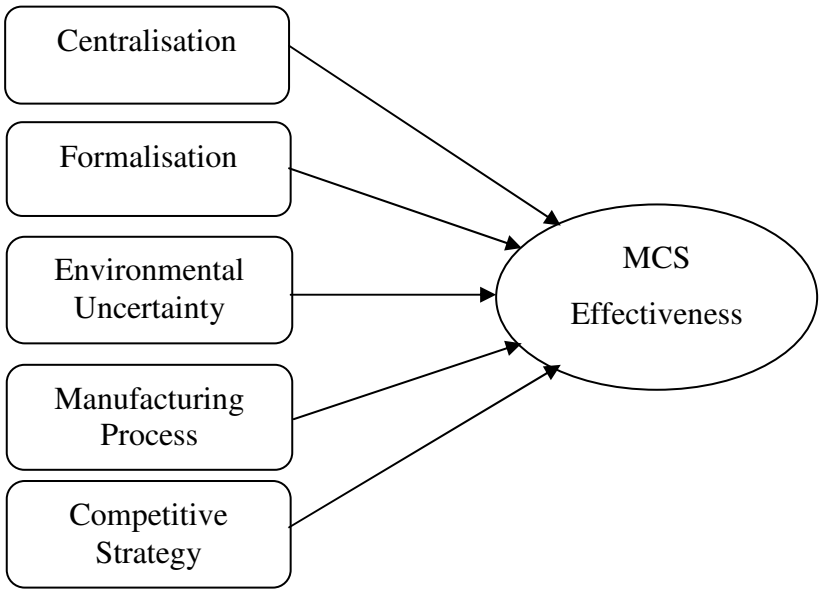
These first level contingency relationships then are elevated to a more complex level by introducing a third variable (mediator) to these relationships; that is the usefulness of MAI. In other words, as depicted in Figure 1.1 Panel C, MAS, as essential and supportive information source for an effective MCS, are expected to play a mediating role on the association between organisational variables and MCS effectiveness. This level is concerned with the Interaction fit approach.

Figure 1.1 Research Theoretical Framework

Panel A: Characteristics of Cost Leaders and Differentiators



Panel B: First Level Contingency Relationships



Panel C: Second Level Contingency Relationships (Mediation)

1.7 Thesis Structure

In addition to this chapter, the thesis comprises seven further chapters. Chapter Two provides an overview of the theoretical literature related to the research interests. It tracks the evolution of MCS definition and identifies the popular MCS types addressed in the management accounting literature. The chapter also provides insights into the contingency theory notions of fit and the common models of MAS/MCS relationships and introduces the organisational variables that potentially influence the effective design and use of MCS. It ends with identifying the characteristics of MAI that facilitate MCS effective design.

Chapter Three, presents a summary of the available relevant previous empirical research studies and is organised into two parts. It begins with empirical research on MCS and strategy and classifies it according to three different aspects of MCS. Comparison of these studies and their limitations are presented. The second empirical research studies are concerned with the relationship between the characteristics of MAI and organisational variables as well as the models of these relationships (i.e. mediation and moderation). This part ends with a comparison and limitations of related previous research studies.

Chapter Four presents the research hypotheses development process, which is organised into three groups whereby the research variables are discussed, and provides justifications for the chosen philosophy and adopted methodology in order to attain the research objectives. In addition, the chapter presents details of the research process and method of data collection in the form of questionnaires as well as the statistical techniques used to analyse the collected data.

Chapters Five, Six and Seven present the data analysis and discussion of the research findings. Chapter five provides the descriptive analysis of the research results that seeks to achieve the first three objectives of this research. The data in this chapter identify the types of MCS types used (i.e. more/less bureaucratic MCS) as well as the performance indicators for determining the effectiveness of MCS and organisational success by the sampled companies. In addition, the chapter provides a detailed description of the importance, availability, and usefulness of MAI in facilitating the

effective design and use of MCS. The data analysis presented in this chapter is based, in most occasions, on the mean scores and, in few cases, on the percentages.

In Chapter Six, results of testing first and second group of hypotheses using different statistical techniques, such as independent t-test, simple as well as multiple regression are presented. The chapter provides and discusses findings related to the difference between cost leaders and differentiators companies in terms of strategy formulation process, MCS types, and usefulness of MAI. It also examines and discusses first level contingency relationships, which is focused on simple causal relationship between organisational variables and MCS effectiveness. Data analysis in this chapter are sought to achieve the first three research objectives (first group of hypotheses) and part of the fourth objective (second group of hypotheses).

Chapter Seven, deals with the final group of hypotheses and, presents and discusses findings related to second level contingency relationships. It examines the effect of MAI usefulness (i.e. mediator variable) on the earlier causal sequence relationships. Mediation regression analysis was applied in this chapter to test the related hypotheses and to accomplish part of objective four. In addition, assumptions of the utilised statistical tests are discussed and provided in details.

Finally, Chapter Eight provides summary of the main findings of this research and discusses the contributions of this study to knowledge. The study limitations and suggestions for future research are presented at the end of this chapter.

1.8 Summary and Conclusion

This chapter has given an overview of the current study in terms of its background, aim and objectives, and research framework. Central to the study is the relationship between MCS and strategy and also the role that MAI is envisaged to have in this relationship. Informed by the relevant literature, the theoretical framework presented in this chapter guides this research study in accordance with its aim and objectives.

The next chapter presents more detailed insights into the relevant theoretical literature on MCS.

Chapter Two

Management Control Systems: A Theoretical Perspective

2.1 Introduction

This chapter reviews the relevant theoretical literature in relation to the main issues in this research study, namely the MAS-MCS relationship. It starts with the definitional evolution of MCS. This is followed by a discussion of contingency theory in management accounting research, including the various notions of fit and the contingent variables that influence MAS/MCS design and use. Two interpretive models of MAS/MCS interactions with contingent variables are described and the appropriate one for the present research is explained. The chapter ends with identifying the essential characteristics of MAI.

2.2 Management Control Systems

2.2.1 Definitions and Historical Perspective

The definition of a MCS has evolved over the years from focusing on the provision of more formal, financially quantifiable information to aid managers in decision making to a system that includes a much broader scope of information. This comprises external information related to markets, customers, competitors, non-financial information related to production processes, predictive information and a broad array of decision support mechanisms, and informal personal and social controls (Chenhall, 2003). Earlier, management control was defined by Anthony (1965, p. 17) as "the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives". According to Langfield-Smith (1997), this definition is limited to envisage MCS as encompassing the largely accounting-based controls of planning, monitoring of activities, measuring performance and integrative mechanisms, and it also served to artificially separate management control from strategic control and operational control. In addition, Simons (1995, p. 5) defined MCS as "the formal, information-based routines and

procedures managers use to maintain or alter patterns in organizational activities." In his definition, Simons was concerned with formal routines and procedures and how these stimulate informal processes that affect behaviour, information-based systems used by senior managers, and the control systems used by managers. Moreover, Otley (1999, p. 364) described MCS as "systems that provide information that is intended to be useful to managers in performing their jobs and to assist organizations in developing and maintaining viable patterns of behaviour". From this point of view, it can be noticed that an MCS is considered as a system that collects useful information managers' use for different purposes. However, the role of the information in influencing employee behaviour to carry out the organisation's strategies is not clear. Furthermore, Chenhall (2003) in his review of the literature pointed out that the terms management accounting, MAS, MCS, and organisational controls are sometimes used interchangeably. In this case, he stated that management accounting refers to a collection of practices such as budgeting or product costing, whereas MAS refers to the systematic use of management accounting to achieve some goals and MCS is a broader term that encompasses MAS and also includes other controls such as personal or clan controls. Finally, organisational controls are sometimes used to refer to controls built into activities and processes such as statistical quality control, just-in-time management.

More recently, Horngren et al. (2005, p. 382), defined management control system as "a logical integration of techniques for gathering and using information to make planning and control decisions, for motivating employee behaviour, and for evaluating performance". In this definition, more attention has been paid to the usage of the information in a way of how to inspire employee actions and evaluate performance, however, the main purposes of motivating employee behaviour still not clear. More recently, Anthony and Govindarajan (2007, p. 7) defined management control as " the process by which managers influence other members of the organisation to implement the organisation's strategies". They described MCS as tools that help managers to steer an organisation toward its strategic objectives and it is one of the tools that managers use to carry out desired strategies. They mentioned that management control information, especially nonfinancial, in industries that are subject to rapid environmental changes, can provide the basis for considering new

strategies. In addition, they stated that strategies also can be implemented through organisational structure, human resources management, and its particular culture. Similarly, Merchant and Van der Stede (2007, p. xiii) define MCS broadly to " include everything managers do to help insure that their organisation's strategies and plans are carried out or, if conditions warrant, that they are modified".

The present study adopts the MCS definition suggested by Anthony and Govindarajan (2007) and Merchant and Van der Stede (2007). The rationale of adopting this definition is its comprehensive conceptualisation of MCS, including the critical role of MAI and the strategy formulation process.

2.2.2 MCS Types

The types of control were described in relation to the behaviour of managers in implementing control systems (Amigoni, 1978). Therefore, controls have been categorised in many ways, for example, *results and action* controls (Ouchi, 1979, Merchant and Van der Stede, 2007), *formal and informal* controls (Amigoni, 1978, Modell, 1996), *tight and loose* controls (Amigoni, 1978, Whitley, 1999), and *personnel and cultural* controls (Ouchi, 1979, Merchant and Van der Stede, 2007).

Results controls are described as a powerful ways to influence employees' behaviour in an organisation by making them take into account their actions' consequences as well as motivating them to discover and improve their talent, consequently directing them into positions where they could perform well. These controls are more suited for decentralised organisations that have independent entities (Merchant and Van der Stede, 2007). In contrast, *action controls* try to ensure that employees carry out (or do not carry out) tasks that are considered to be desirable (undesirable) to their organisations. Although action controls are commonly applied in business organisations, they are not effective in all circumstances. Their effectiveness' depends on managers' knowledge of the desired (or undesired) actions and their ability to ensure that the desirable actions occur or prevent the undesirable ones (Merchant, 1998).

Formal controls include standard procedures, rules, policies, and budgeting systems aim to make sure that precise targets will be achieved as well as monitor, measure, and take corrective actions. On the other hand, *informal controls* are not deliberately designed, thus they include unwritten rules and policies that usually derived from organisation's culture (Langfield-Smith, 2007). Formal and informal controls are important components of MCS; however the effectiveness of formal controls may depend on the extent and effectiveness of informal controls in place (Otley, 1980, Flamholtz, 1983).

Tight controls refer to control systems where setting objectives is restricted to certain members at certain levels, low discretion, targets must be achieved and considered as an organisation's commitments, and heavily rely on accounting measurements to evaluate performance. In contrast, with *loose controls*, the participation in setting objectives is high, more flexibility in target achievement, and performance is evaluated on the basis of combination of financial as well as non-financial indicators (Amigoni, 1978, Whitley, 1999).

Personnel controls are derived from the natural behaviour of employees to control and/or motivate themselves in accordance with/against their organisations' objectives. This type of control could help employees to understand what an organisation wants, and ensure that they have the capabilities and resources to achieve a good job as well as increasing the likelihood to engage in self-monitoring. On the other hand, *cultural controls*, which built, for example, on shared values and beliefs, motivate employees to control each other's behaviours (Merchant and Van der Stede, 2007).

Recently, in a response to the concerns that have been raised in the MCS relevant literature (e.g. Langfield-Smith, 1997, Chenhall, 2003) regarding the broader elements of controls and the diversity in number and type of controls that have been examined, which may subsequently lead to overly simplistic models as well as facing difficulties to build and develop a coherent body of MCS literature, Auzair and Langfield-Smith (2005) identify several distinctive features of MCS from previous studies. They draw on definitions and descriptions of bureaucratic controls used in early research (e.g. Ouchi, 1979, Whitley, 1999, Chenhall, 2003) to suggest that one end of the control

continuum is *more bureaucratic* (i.e. formal, action, tight, restricted, and impersonal controls), and the other end of continuum is *less bureaucratic* (i.e. informal, results, loose, flexible, and interpersonal controls).

This implies that in order to understand MCS in contemporary organisations, it is necessary to address them through this comprehensive control continuum. For example, in adopting and adapting this continuum approach, Auzair (2011) found that cost leadership strategy was positively associated with both less and more bureaucratic MCS while product differentiation strategy was associated with less bureaucratic MCS in Malaysian hotels.

Therefore, this research study adopts the MCS classification of more/less bureaucratic introduced by Auzair and Langfield-Smith (2005) to identify the types of MCS used in manufacturing companies in Libya.

2.3 Contingency Theory: Overview

The basic assumption of the contingency theory approach to management accounting research is that the circumstances in which an organisation operates will determine the main features of its accounting system. Hence, they will be no appropriate MAS/MCS that apply equally to all organisations in all situations (Waterhouse and Tiessen, 1978, Otley, 1980, Emmanuel et al., 1991, Fisher, 1995).

Moreover, contingency theorists in the management accounting literature posit that the form of organisations' MAPs take and the intensity of their usage are determinant by the organisational competitive environment (Anderson and Lanen, 1999). Therefore, organisations with different business environment will have different strategic plans and will respond according to their situations, and consequently to attain the desired goals may require different management information system (Hoque, 2004). In other words, changes in the organisation’s external environment will lead to change in an organisation’s MAS. This assumption is based on the argument that when this change occurs, managers require different forms of MAI to support their decision making, and to aid them in monitoring strategies progress (Baines and Langfield-Smith, 2003). Thus, the appropriate match between

organisational environment and systems has been considered as a primary assumption of much of empirical contingency-based management accounting research (e.g. Chenhall and Langfield-Smith, 1998c, 1998b). In addition, previous research stated that high organisational performance results from the matching of organisation's environment, strategy and internal structures and systems (e.g. Govindarajan and Gupta, 1985, Govindarajan, 1988).

According to Chenhall (2003), contingency-based research is widely used in early studies in an attempt to explain the effectiveness of MCS by investigating the designs that best match to contextual variables (e.g. environment, technology, structure, strategy, and size). Furthermore, recent MCS research continued to adopt the contingency theory approach albeit adopting more contemporary definitions of its variables (e.g. Abdel-Kader and Luther, 2008).

2.4 Notion of Fit in Contingency Theory

Fit has been described as the heart of contingency theory and three different forms of fit have been used to study the relationship between MAS/MCS and outcome variables. These forms of fit are: Selection fit, Interaction fit, and Systems fit (Chenhall and Chapman, 2006).

2.4.1 Selection Fit Approach

Studies used this form of fit examine the relationship between contextual variables and MAS/MCS without indicating whether this relationship affects an organisation's performance or not. The link to performance is not considered because of the implicate assumption in this approach that organisations operate in equilibrium situations. As a result, organisations that have taken steps to make sure that MAS/MCS suit their context are only can be observed by researchers and, therefore these organisations at their best performance, whereas organisations that have not fruitful the requirements of MAS/MCS to their context would not be survived and, thus could not be identified (Drazin and Van De Ven, 1985, Chenhall and Chapman, 2006).

2.4.2 Interaction Fit Approach

In contrast to the previous approach, the interaction approach links the relationship between contingent variables and organisational structure (i.e. MAS/MCS) to organisational performance. Here the focus is not so much on understanding the congruence between context and structure as in the selection approach, but rather recognising the variance in organisational performance via the interaction effects of the contingent and organisational structure (Drazin and Van De Ven, 1985). This dynamic actions implies that poor performing organisations are expected to be identified by researchers (Chenhall and Chapman, 2006).

Most of the studies (e.g. Simons, 1987, Abernethy and Guthrie, 1994, Abernethy and Brownell, 1999, Van der Stede, 2000, Kober et al., 2003) that have adopted the selection and interaction approaches of fit consider how performance measures are related to only a single or pairs of contextual variables. Hence, the emphasis on considering multiple contextual variables when designing performance measures revealed the Systems approach of fit (Chenhall and Chapman, 2006).

2.4.3 Systems Fit Approach

According to Drazin and Van De Ven (1985, p. 520) the systems approach "emphasises the need to adopt multivariate analysis to examine patterns of consistency among dimensions of organizational context, structure, and performance".

Moreover, this approach is the most recent and least-tested form of contingency theory, it involves a more holistic concept of fit where multiple contingencies, several control systems are simultaneously modelled on several outcome variables and an optimal systems fit occurs when all design elements (structure, control, context) are congruent (Selto et al., 1995).

Recently, Gerdin and Greve (2004) sought to reclassify the different forms of contingency fit in the particular context of strategy-MAS/MCS research. According to these authors, the first distinction is between a *Cartesian* and a *Configuration* approach. Whilst the Cartesian approach assumes that a fit between a contingent

variable and a control system is along a continuum that allows for frequent and small movements from one point of fit to another, the Configuration approach, on the other hand, assumes that there are only few and discrete points at which fit exists. Cartesian research is characterised by reductionism while Configuration research takes a holistic view, and these can respectively be associated with the interaction and systems models as defined by Drazin and Van De Ven (1985).

The next sub-classification within the Cartesian and Configuration forms of fit is *Congruence* and *Contingency* approaches. The congruence assumption is similar to Drazin and Van De Ven's (1985) Selection of fit category since it assumes that only organisations who perform well survive and can be observed, therefore the research task explores the nature of the context-structure without examining whether they affect performance or not. On the other hand, the contingency approach will consider the effect on outcome variable and fit is known as a positive impact of certain combinations of contingent variables and MAS/MCS on organisational performance. A second sub-classification in the Cartesian subset and within the congruence and contingency approaches is the use of *moderation* and *mediation* models (Gerdin and Greve, 2004).

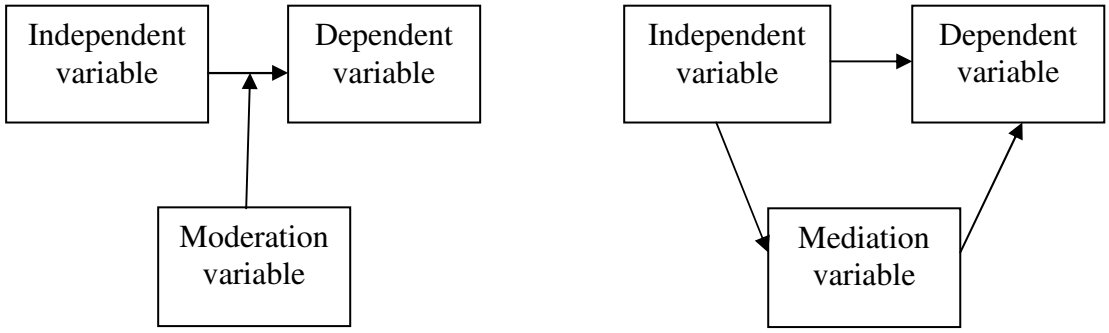
The Selection/Congruence approach is utilised in this study to examine the relationship between organisation's competitive strategy and the design/adoption of MCS types, while the Interaction/ Contingency approach is applied to investigate the association between the individual effects of each contingent variable, included in this study, on the outcome variable (i.e. MCS effectiveness). In addition, the potential intervening effect (i.e. mediation) of MAI on the relationship between contingency variables and the outcome variable is examined.

2.5 Models of MAS/MCS Interactions

The most frequent models used in the MAS-strategy literature according to Gerdin and Greve (2004) are the moderation and mediation approaches (see Chapter Three, Table 3.3). The moderation approach (see model A in Figure 2.1) suggests that the influence of an independent variable (e.g. strategy) on the dependent variable (e.g. performance) is contingent upon the level of the moderator variable (e.g. MAS/MCS

information). In other words, by adapting MCS to strategy, performance could be enhanced. This first interpretation of the current premise reflects a notion of a match between strategy and MAS/MCS in order to support performance. On the other hand, the mediation approach (see model B in Figure 2.1) suggests that the influence of the independent variable (e.g. strategy) on the dependent variable (e.g. performance) occurs directly and/or indirectly through the mediator variable (e.g. MAS/MCS). This second interpretation of the premise reflects a notion of sequence whereby strategy first influences MAS/MCS which in turn affects performance in the indirect path.

Figure 2.1 The Moderation and Mediation Models



Model (A): Moderation **Model (B): Mediation**

(Adopted from Gerdin and Greve, 2004)

While both models may be valid, only one model can give a better view in a particular situation, and there are complications related to the assumption underlying the moderation logic. The moderation approach relies on the assumption that the moderator has " *non-significant, bivariate relationships with both the independent and dependent variables*" (Shields and Shields, 1998, p. 51). This would mean the moderator is not theoretically related to either the independent variable or the dependent variable; for example MAS/MCS design and strategy are not theoretically related (Gerdin and Greve, 2004). In this regard, not only previous research provided theoretical support for such link, but the absence of this link could constitute an important paradox. By definition, the moderation approach assumes that no

relationship between MAS/MCS design and strategy exists while the premise itself states that '… *MCS should be tailored explicitly to support the strategy of the business to enhance competitive advantage and encourage superior performance*' (Langfield-Smith, 2007, p. 753), which implicitly assumes a strong link between them. In this case, the moderation model cannot give an accurate description to the situation, therefore it is believed that the mediation model is an alternative model that could paint a clear picture to the associations between variables (Gerdin and Greve, 2004).

In sum, the current premise has been modelled in previous studies following either moderation or mediation approach. However, as it assumes the link between MAS/MCS and strategy, the moderation logic may be problematic to certain extent. The moderation and mediation forms of fit have fundamentally different theoretical meanings; consequently results based on one of the models cannot be validated with results obtained from the other. Furthermore, their review concluded that some studies using moderation or mediation approach rely on each other to incorrectly argue that their results are contradictory or supported. In addition, some studies that examined the intervening variable model had used the terms mediating and indirect effect interchangeably; despite the fact that they differ in meaning and conditions (this will be explained in more details through statistical analysis in Chapter Seven, Section 7.2). Therefore, in part, this could explain the conflicting and ambiguous nature of the findings of previous research on MAS-MCS-strategy relationships.

2.6 Contingent Variables that Influence MAS/MCS Design

The contingency theory approach became the leading paradigm for research on MAS/MCS design in the last few decades (Dent, 1990). Reviews conducted by Chenhall (2003, 2007) of empirical research of MAS/MCS contingency-based research since the early 1980s have revealed several contingent variables in relation to the design and use of MAS/MCS, however few of them was found relatively popular and more relevant to the design and use of these systems, including environmental uncertainty, organisational structure, manufacturing technology, and competitive strategy. These variables are discussed in the following four subsections.

2.6.1 Environmental Uncertainty

Organisational environment was defined by Willmott et al. (2010, p. 140) as "*all elements that exist outside the boundary of the organisation and have the potential to affect all or part of the organisation*". External environment, especially uncertainty, has been recognised as an important contextual variable in the MAS/MCS design research (Chapman, 1997, Otley and Wilkinson, 1998, Chenhall, 2003, 2007).

However, this factor has been investigated from different points of view in the MAS/MCS literature. One point is *perceived environmental uncertainty* (PEU) which focuses on the lack of information on the environmental factors, inability to assign probabilities on how the environment will affect success or failure, and not knowing the effects on organisational performance if decisions were incorrect (e.g. Chenhall and Morris, 1986, Mia, 1993, Chong and Chong, 1997).

Task uncertainty (TU) is another point of view that has been widely examined in the literature which paid more attention to the external environment compared to PEU. Specifically, TU focused on the competition intensity, the dynamism and unpredictability of the external environment (e.g. Chong, 1996, Choe, 1998, Teerooven and Bhagtaraj, 2008). In addition, the term *environmental uncertainty* was commonly used to capture the influence of the external environment on the organisational success and effectiveness (e.g. Lal and Hassel, 1998, Hoque, 2004, Kober et al., 2007).

Because of the strong link between information and uncertainty, the literature of MAS/MCS emphasise the importance of relevant MAI to reduce the influence of high levels of environmental uncertainty situations upon organisational performance (Hoque, 2004). In respect to the vital role of the information in increasing the managers' confidence in making decisions, Galbraith (1974) pointed that "*the greater the task uncertainty, the greater the amount of information that must be processed among decision makers during task execution in order to achieve a given level of performance"*.

Chenhall (2007) mentioned that environmental uncertainty in the MAS/MCS literature has been linked to the characteristics of MAI (e.g. scope, timeliness), more subjective performance evaluation, non-financial performance indicators, and budget participation.

2.6.2 Organisational Structure

Organisational structure refers to "*the formal specification of different roles for organisational members, or tasks for groups, to ensure that the activities of the organization are carried out. Structural arrangements influence the efficiency of work, the motivation of individuals, information flows and control systems and can help shape the future of the organization*" (Chenhall, 2003, p. 144).

Early studies (e.g. Pugh et al., 1968, Bruns and Waterhouse, 1975, Merchant, 1981), identified organisational structure variable in several dimensions in relation to the choice of accounting-control mechanisms. Centralisation (decentralisation) is one dimension which was the most commonly investigated among the MAS/MCS contingency research (e.g. Chenhall and Morris, 1986, Gul and Chia, 1994, Chang et al., 2003, Jermias and Gani, 2004, Abdel-Kader and Luther, 2008). Authors have different views regarding this dimension; however they agree that centralisation (decentralisation) is about the extent of authority delegation to lower levels of management. For instance, Pugh et al.,(1968, p. 76) stated that "centralization has to do with the locus of authority to make decisions affecting the organisation. Authority to make decisions was defined and ascertained by asking, who is the last person whose assent must be obtained before legitimate action is taken- even if others have subsequently to confirm the decision". Hage and Aiken (1967) described centralisation as the extent to which power is distributed among social positions.

On the other hand, formalisation, as a dimension of organisational structure, refers to the use of rules and procedures in an organisation (Pugh et al., 1968, Fredrickson, 1986). In more formalised organisations, where many rules and procedures are applied, the requirements for organisational coordination and control (i.e. accounting information system) was found significantly affected by organisational formalisation (Nicolaou, 2000). Specifically, formalisation is recognised as the most characteristic

feature of the bureaucratic controls in the sense of written and standardised responsibilities and procedures definitions (Child, 2005).

2.6.3 Manufacturing Technology

According to Chenhall (2003, p. 139) technology "refers to how the organisation's work processes operate (i.e. the way tasks transform inputs into outputs) and includes hardware (e.g. machines and tools), materials, people, software and knowledge". The review identifies three relevant generic types of technology to MAS/MCS design: complexity, task uncertainty and interdependence.

Complexity type (i.e. diversity), which is derived from standardisation of work (Chenhall, 2003), was categorised by Woodward (1965) into small batch, large batch, process production, and mass production. In this respect, organisations that produce non-standard, differentiated products are more likely to adopt complex technologies, which in turn might led to process with low analysability and many exceptions. In addition, managers in these organisations may find difficulties in understanding the manufacturing processes as well as lack of ability to measure the outputs of the process. Therefore, formal financial MAS/MCS mechanisms, which based on financial controls, could not be appropriate ones in similar situations (Chenhall, 2003, 2007).

On the contrary, mass production and process technologies are more likely to be employed by organisations that produce standard, undifferentiated products. In these organisations managers have better understanding of processes and are able to assess their outputs. In such situations, formal financial MAS/MCS (e.g. standardised, administrative controls) are required (Chenhall, 2003, 2007).

In the last three decades new important dimensions of manufacturing technology context were recognised in the MAS/MCS research such as Total Quality Management (TQM), Just in Time (JIT), and Flexible Manufacturing System (FMS) (Chenhall, 2003). The main purpose of implementing these advanced technologies/practices is to improve and/or maintain the organisation's competitive position among competitors. In addition, this implementation requires changes in the

organisational manufacturing technologies which in turn might lead to changes in and develop MAS/MCS mechanisms to support the new technology environment (Bruggeman and Slagmulder, 1995, Chenhall, 1997, Abdel-Kader and Luther, 2008).

2.6.4 Competitive Strategy

Competitive strategy (i.e. business strategy) is concerned with how organisations compete within their particular industry and try to achieve a competitive advantage in relation to their main competitors (Porter, 1980, Langfield-Smith, 1997, Slater and Olson, 2001).

Relatively recent literature emphasises the importance of strategy as a contingent variable that plays a key role in the MAS/MCS design/adoption (e.g. Gerdin and Greve, 2004, Langfield-Smith, 2007). In this regard, several strategic typologies have been recognised in the strategy-MAS/MCS research (i.e. Miles and Snow, 1978, Porter, 1980, Gupta and Govindarajan, 1984) to explore and understand the complex relationship between strategy and MAS/MCS (Langfield-Smith, 1997).

According to Porter's (1980) generic typology, organisations could compete and attain a competitive advantage either by following cost leadership or differentiation priorities. Cost leaders aim to provide products at lower cost possible in their industry. The competitive advantage could be achieved by, for example, obtaining favourable raw material prices, and using efficient manufacturing technology to reduce product costs (Langfield-Smith, 2007). On the other hand, differentiators seek to make products with unique features to satisfy their customers. These include superior product quality, availability of the product, delivery and after-sales service, and product flexibility (Langfield-Smith, 1997, Chenhall and Langfield-Smith, 1998c). However, this does not necessarily mean that cost leaders would ignore quality, availability, and other differentiators' features, but rather they might come in lower level of emphasis. Similarly, companies pursuing product differentiation strategy would place more emphasis on differentiation priorities, and cannot totally omit, for instance costs, efficiency and, other cost leadership priorities (Porter, 1980, Govindarajan, 1988, Langfield-Smith, 2007).

Miles and Snow's (1978) typology describes three strategic types: defender, prospector, and analyser. Defenders (or comparatively cost leaders) operate in a more stable environment, offering a narrow range of products, and for their organisational success they pay more attention to finance, production, and engineering and less emphasis on marketing and research and development. In contrast, prospectors (or comparatively differentiators) compete through product innovation and market development. They continuously search for opportunities to introduce new or develop the existing products, consequently create changes and uncertainty to their competitors' environment. Maintaining industry leadership is more important than profit performance, thus they intensively focus on market research and development. Finally, analysers hold the best characteristics of defenders and prospectors (Bruggeman and Van der Stede, 1993, Langfield-Smith, 1997).

Gupta and Govindarajan (1984) introduced the mission typology which can be either build, hold or harvest. The build strategy aims to increase market share and improve competitive position, even though this may sacrifice short term profits. This strategy could be achieved by organisations that have some competitive advantages within an industry. On the contrary, organisations that follow harvest strategy attempt to earn a maximum short-term profit and cash flow instead of improving market share. Hold strategy combines the characteristics of the previous two missions. Organisations adopt this strategy in order to protect their market share and competitive position as well as achieving an acceptable return on investment (Shank and Govindarajan, 1993, Langfield-Smith, 2007).

2.7 Strategy Formulation

Regardless of what strategic typology an organisation adopts, formulating and implementing strategies, in theory at least, should be managed and not left to chance. In this context, strategy formulation is defined by Anthony and Govindarajan (2003, p.9) as "the process of deciding on the goals of the organisation and the strategies for attaining these goals". Porter (1996) describes formulating strategy as a purposeful, intentional action to develop a company's competitive advantage and therefore improve its performance. This require organisations to adopt formalised and

analytical processes for formulating strategies that involves identifying organisation's resources, capabilities, opportunities, analysing its strengths and weaknesses in marketplace, and guiding employees to ensure a successful pursuing to the organisation's targets (Hofer and Schendel, 1978, Merchant and Van der Stede, 2007).

On the other hand, strategy implementation refers to the actions that should be taken to carry out the chosen strategy. These actions include designing the appropriate MAS/MCS to support an organisation's strategy (Langfield-Smith, 1997). However, the strategy formulation process often considers the procedures that will be followed to achieve the desired goals. In other words, a well-formulated strategy needs to take into account how to implement it, and learn through implementing the company's strategy how to reformulating it if unexpected circumstances occurred (Gimbert et al., 2010). This implies that strategy formulation cannot be isolated from strategy implementation (Anthony and Govindarajan, 2003). In this context, empirical studies of MCS and strategy recognised the effective role of MCS in strategy formulation (e.g. Simons, 1990), and implementation (e.g. Govindarajan, 1988), as well as strategic change (e.g. Abernethy and Brownell, 1999, Anderson and Lanen, 1999, Kober et al., 2003).

Langfield-Smith (2007) stated that strategies could be either intended (deliberate) or realised. The former are formally designed, however not necessarily should be successfully executed due to a failure at assessing the organisational environment, impractical ideas, or they are not flexible enough to cope with changes that might occur during implementation. In contrast, strategies that organisation realise (i.e. realised strategies) not always derive from the intended strategies, but could be from new forms of strategies that emerge during the implementation process. She pointed out that MCS may not be supportive to the organisational effectiveness if the intended strategy is not realised and a different strategy emerged. In other words, an effective strategy formulation process takes into account any possible future changes that might occur and influence the strategy implementation.

2.8 MCS Effectiveness

Recent and early contingency theory studies have recognised effectiveness as an importance dependent variable to determine the appropriate match between MAS/MCS and organisational variables (e.g. Otley, 1980, Langfield-Smith, 1997, Nicolaou, 2003, Jermias and Gani, 2004, Adebayo and Annukka, 2009).

Given the demonstration has been made in the relevant management accounting literature (e.g. Govindarajan and Gupta, 1985, Dent, 1990, Govindarajan and Fisher, 1990) that MCS should be designed to support competitive strategy, and the adopted definition of MCS for the current study, the effectiveness of an organisation's MCS reflects how well these systems are designed or adopted to support the requirements related to strategy formulation and implementation. As a result, MCS effectiveness implies the adequacy of MCS that matches organisation's settings and requirements in order to ensure successful implementation of its strategies.

2.9 The Characteristics of MAI

As mentioned in Chapter One, MAS is considered as an organisational control subsystem, this subsystem facilitates MCS by providing relevant information to monitor and direct members' actions in order to attain organisation's intended strategies which in turn leads to achieve superior performance (Chia, 1995, Nicolaou, 2003, Macintosh and Quattrone, 2010). This implies the key role that MAI play in facilitating the effective design and use of MCS. The role of MAS could be addressed in terms of the characteristics of MAI including scope, timeliness, aggregation, and integration (e.g. Gordon and Narayanan, 1984, Chenhall and Morris, 1986, Mia, 1993). These characteristics are presented in the following four subsections.

2.9.1 Scope

Within this dimension, MAI could be narrow or broad scope. The narrow scope of MAI provides information that focuses on internal events, financial, and historically-based information (Chenhall and Morris, 1986, Bouwens and Abernethy, 2000, Tillema, 2005). On the other hand, broad scope of MAI refers also to information which related to external environment (i.e. economic, non-economic), non-financial in

nature, and future oriented (Gordon and Narayanan, 1984, Govindarajan and Gupta, 1985, Bouwens and Abernethy, 2000, Tillema, 2005).

2.9.2 Timeliness

According to Chenhall and Morris (1986), timely MAI is more likely enables managers to response quickly and make the appropriate decisions in a timely manner. Timeliness refers to the speed and frequency of reporting, and presenting the information upon request (Chenhall and Morris, 1986, Choe, 1998, Naranjo-Gil, 2009).

2.9.3 Aggregation

Aggregated MAI is concerned with the level of summarised information related to functional activities, and according to time period or through decisions models (Chenhall and Morris, 1986). This information provides managers at the functional level with information regarding the outputs of decisions taken in other functional area, as well as helps them to evaluate their decisions outcomes over time (Bouwens and Abernethy, 2000).

2.9.4 Integration

This dimension reflects the interdependence and coordination between different departments in the company. Integration refers to the information about other departments' activities in the same company and the effects of decisions have been taken within a single department on the performance of other departments as well as the company's whole performance (Chenhall and Morris, 1986, Chia, 1995, Teerooven and Bhagtaraj, 2008). This information may include details on inputs, outcomes, as well as the processing activities. For instance, it may include information about other functional department outputs type and volume, as well as the financial information (e.g. costs, revenues) attached to these outputs (Bouwens and Abernethy, 2000).

2.10 Summary and Conclusion

This chapter has presented a theoretical background to the main issues addressed in this research. After tracking the development of MCS definition since 1965 as well as identifying the distinctive types of MCS investigated in previous research, the chapter provided an overview to the contingency theory and its notion of fit. The contingent variables that have been examined in relation to MAS/MCS design have been highlighted. Strategic typologies used in MAS/MCS research were covered in this overview and the role of MAS/MCS in the process of strategy formulation has also been summarised. Finally, definitions and brief descriptions of the characteristics of MAI were presented. The information gleaned from this review partly informs the theoretical model developed for the current study of MCS in Libyan companies (see Chapter One).

In the next chapter, empirical studies of MAS/MCS and strategy, and the characteristics of MAI are presented and discussed.

Chapter Three

A Review of Contingency Theory-Based Studies of MCS/Strategy and MAI

3.1 Introduction

In the previous chapter, relevant theoretical literature regarding contingency theory, MCS definition and types, strategic typologies, and the characteristics of MAI was discussed. This chapter aims at reviewing relevant empirical literature and is organised into two sections. The first section focuses on empirical studies related to MAS/MCS and strategy, and the second section addresses the empirical research related to the characteristics of MAI.

3.2 Empirical studies of MCS and Strategy

The purpose of this first section is to critically review previous studies of MCS and strategy. A total of 23 studies have been identified[2], most of them published in the 1990s and 2000s (see Table 3.1).

Table 3.1 MCS Studies in the Last Four Decades

MCS conceptualisation	1980s	1990s	2000s	2010s	Total
Non-Accounting MCS studies	-	1	1	-	2
Accounting MCS studies	2	7	6	2	17
Hybrid studies	-	-	3	1	4
Total	**2**	**8**	**10**	**3**	**23**

3.2.1 Evaluation Criteria

The criteria used to analyse previous studies are informed by methods found in some review articles (e.g. Lev and Ohlson, 1982, Langfield-Smith, 1997). These criteria are: conceptualisation of MCS, strategic typology, method of data collection and

[2] Summon search engine and Google Scholar were the main sources of these studies.

sample characteristics. A detailed summary of each study reviewed in accordance with these criteria can be found in Table 3.2 which follows the discussion in the three following sections. This is followed by a comparison between findings from and limitations of previous research.

3.2.2 "Non-Accounting" MCS Studies

Studies under this category focused on administrative tools, as MCS mechanisms, that influence employees' behaviour in accordance with organisational targets. Govindarajan and Fisher (1990) surveyed 121 strategic business units (SBUs) managers in 24 large manufacturing companies in the USA, concluded that effective SBUs pursuing cost leadership strategy tend to combine output controls with their high level of recourse sharing. In addition, they found that successful SBUs following product differentiation strategy with high recourse sharing emphasised behaviour controls, whereas the ones with low recourse sharing utilised output controls.

In a recent study of 121 financial controllers of service organisations operating in Australia, Auzair and Langfield-Smith (2005) reported that cost leaders companies placed greater emphasis on more bureaucratic MCS (i.e. action, formal, tight, restricted, and impersonal controls) compared to product differentiators who emphasised less bureaucratic MCS (i.e. results, informal, loose, flexible, and interpersonal controls).

3.2.3 "Accounting" MCS Studies

It is worth noting here that most of the studies are the accounting type (17 out of 23), and that 13 of the 17 studies were in the 1990s and 2000s, the period that saw an explosion in the empirical management accounting research.

According to this category, studies defined MCS in terms of different aspects of MAS. The most popular dimension among these studies was budgeting systems. Budgets are one of the management accounting techniques that aims to control costs, and guide humans to achieve company targets (Argyris, 1953). In addition, budgets are considered to be an important MCS mechanism companies adopt in their early life stage (Davila and Foster, 2005, King et al., 2010). Other dimensions addressed by

many studies were the use of MAS practices in general, as well as the reliance on MAI in particular. In this regard, several characteristics of budgeting systems were addressed to distinguish between tight and loose controls (e.g. Bruggeman and Van der Stede, 1993, Collins et al., 1997, Van der Stede, 2000), whereas the interactive and diagnostic style of budgets use attracted other studies (e.g. Abernethy and Brownell, 1999, Bisbe and Otley, 2004).

From another point of view in addressing MCS, some studies paid attention to the level of sophistication of MAPs (e.g. Chenhall and Langfield-Smith, 1998c, Baines and Langfield-Smith, 2003, Abdel-Kader and Luther, 2008), the use of MAS (e.g. Chenhall and Morris, 1995, Anderson and Lanen, 1999), and the use of financial and non-financial information (e.g. Abernethy and Guthrie, 1994, Baines and Langfield-Smith, 2003, Bisbe and Otley, 2004, Hoque, 2004, Naranjo-Gil and Hartmann, 2006). These studies are reviewed next.

In a study of ten characteristics of accounting control systems (e.g. tight budget controls, external scanning, cost control), Simons (1987) surveyed 106 CEOs of manufacturing companies in Canada, reported that prospector companies emphasise the importance of forecast data, tight budget controls, frequency reporting and monitoring results. On the other hand, defenders were negatively associated with tight budget controls and monitoring results, but they emphasised the importance of incentive bonus that was based on the achievement of employees' targets.

In an attempt to identify the relationship between seven characteristics of budget control systems and strategic priorities in companies operating in Belgium from different industries, Bruggeman and Van der Stede (1993) interviewed 18 financial controllers and general managers reported that tight controls were optimal for companies following cost leadership strategy as well as companies pursuing differentiation strategy producing standard products. In contrast, loose controls were found to be appropriate for differentiators who based their strategy on product flexibility. The study found that, in some cases, business strategy interacted with operational strategy to determine the tight controls features. Similarly, Van der Stede (2000) surveyed 153 strategic business unit general managers of large companies

headquartered in Belgium, found that units follow product differentiation, utilise loose budgetary controls whereas cost leaders do not benefit from budgetary slack. In 1997, Collins et al. surveyed 128 managers and accountants of large companies from central and south Latin America concluded that only companies' follow prospector strategy type used budgets intensively compared to defender, analyser, and reactor type strategies.

Recently, a survey of 144 members of Australian Association Practice Managers by King et al. (2010) about budgeting practices and their relation to organisational factors, found that the use of written budgets was positively associated with organisation size. However, the extent of this use was also positively associated with decentralisation as well as with cost leadership strategic priorities, but negatively related to dynamic environmental uncertainty.

In respect of the interactive and diagnostic style use of budgets, Abernethy and Brownell (1999) reported that the interactive use of budgets by CEOs of 63 large public hospitals in Australia had more positive impact on the relationship between strategic change (i.e. from defender toward prospector), and organisational performance compared to when they were used diagnostically. In a similar manner, Bisbe and Otley (2004) surveyed 58 CEOs of medium sized mature manufacturing companies in Spain, found that the interactive use of three MCS mechanisms (i.e. budget system, balance scorecard, and project management systems) moderates the effect of product innovation on company's performance.

Regarding the use of advanced and sophisticated MAPs, Chenhall and Langfield-Smith (1998c) conducted a study of 78 senior managers of large manufacturing companies operating in Australia found that high performing companies pursuing product differentiation priorities benefit from all management techniques and utilise contemporary MAPs, while cost leaders ones implemented few management techniques and relied less on advanced MAPs compared to traditional accounting techniques. Similarly, in the same region, Baines and Langfield-Smith (2003) surveyed 141 general managers of large manufacturing companies in Australia reported that increased competitive environment has increased the emphasis on

product differentiation priorities which in turn influenced the changes in organisational design, manufacturing technology, and advanced MAPs (e.g. ABC, target costing, ABM, value chain analysis) which result in improved organisational performance.

In the UK, Abdel-Kader and Luther (2008) surveyed 122 management accountants and 123 production managers of 48 food and drinks companies concluded that sophisticated MAPs (i.e. 38 accounting techniques) were emphasised in companies characterised as follow: high uncertain environment, powerful customers, decentralised, large sized, and employ advanced management techniques. In addition, the potential impact of strategic priorities (i.e. product differentiation, cost leadership) on the level of sophistication of MAPs was not supported.

In a developing country, namely India, Anderson and Lanen (1999) examined the relationship between external environment (i.e. competition) and MAPs evolution in 14 private companies from different industries. The study reported that changes in external environment have prompted changes in organisational strategic priorities, from defender toward prospector, as well as organisational structure, especially MAPs. They concluded that pursuing particular strategic priorities determines the use of MAPs. Chenhall and Morris (1995) conducted a survey of 72 managers of large companies from the UK, France, Germany, and the USA, found that a combination of organic decision and communication process, and extensive use of MAS were associated with enhanced performance to a greater extent in companies follow entrepreneurial strategy than in their counterpart who follow conservative strategy.

In relation to the use of financial and non-financial MAI as MCS mechanisms, Abernethy and Guthrie (1994) studied the relationship between managers' choice of accounting and non-accounting information and organisations' strategic priorities in two large companies operating in Australia. They surveyed 49 strategic business unit managers, reported that broad scope of MAI (e.g. non-financial, future oriented) was associated more positively with performance in prospectors than in defenders companies. In 2003, Baines and Langfield-Smith surveyed 141 general managers of large manufacturing companies in Australia reported that change in emphasis toward

differentiation strategy influenced changes in companies' configurations. These changes led to greater reliance on non-financial MAI, and this in turn improved company's performance.

Hoque (2004) conducted a survey of 52 CEOs of large manufacturing companies operating in New Zealand, reported that there was a significant positive indirect relationship between strategic priorities (i.e. prospector, defender) and performance acting through managers' use of 13 non-financial indicators for performance evaluation. However, no relationship was found between environmental uncertainty and performance through the use of non-financial performance indicators. In 2006, Naranjo-Gil and Hartmann surveyed 92 top management teams (TMTs) of public hospitals in Spain to identify the difference between TMTs in the use of MAS in relation to strategy implementation (i.e. cost reduction, flexibility strategy). They reported that TMTs background influences the use of MAS which in turn influences the implementation of strategic priorities. Further, the study found that financial MAI is important for both cost reduction and flexibility strategic priorities. On the other hand, the use of non-financial MAI, use of MAS in an interactive manner and for resource allocation supported strategy implementation regardless of the adopted strategy.

Recently, Tsamenyi et al. (2011) surveyed 215 finance managers from different industries in China to investigate the relationship between competitive strategy, MCS, and performance. MCS were conceptualised in terms of financial and non-financial MCS. They found that for companies pursuing cost leadership strategic priorities; the use of more financial based MCS had a positive effect on their performance, while of those following product differentiation strategic priorities, the use of more non-financial based MCS led to improvement in their performance.

3.2.4 Hybrid Studies

Four studies used a combination of accounting and non-accounting control systems in addressing MCS. Kober et al. (2003) conducted a case study in a public sector agency in Australia using interviews, questionnaire survey and documentation review. They utilised 27 characteristics to describe MCS in this agency. These characteristics were

grouped into several MCS mechanisms; result monitoring, cost controls, bureaucratic controls, communications, resource sharing, tightness of controls, professional controls, organisational culture, and tailoring of controls to specific user needs. The study found that there was a change in MCS mechanisms as the organisation's strategic priorities shifted from reactor toward prospector and dealing with increased environmental uncertainty. Further, they suggested that a proper match between MCS and strategy led to performance enhancement, and reported a significant increase in the use of MCS mechanisms over the three periods investigated.

Again, the same authors, in 2007, conducted a retrospective study to the same organisation to identify the possible dual relationship between MCS and strategy (i.e. MCS mechanisms shape, and shaped by, strategy). The study adopted all previous 27 characteristics to describe MCS. They reported that there was a change in the strategic priorities from reactor to prospector over the three time periods investigated. In addition, the results indicated that change in strategic priorities was facilitated by increased use of result monitoring as well as cost controls in an interactive manner, which implies that MCS changed to match the strategic priorities being pursued. The study found support for the two way interactions between MCS and strategy.

Jermias and Gani (2004) surveyed 106 business unit managers of 26 Indonesian companies listed under consumer goods industry. They utilised output controls, behaviour controls, and two types of MAS (i.e. MAS supports cost leadership priorities, and MAS support product differentiation priorities) to describe companies' MCS. The study reported that business unit effectiveness is enhanced when there was a match between organisational factors regardless of the strategic priorities being pursued. Further, behaviour controls and MAS type that facilitates companies' capability of producing unique products and achieves customer satisfaction was in favour of differentiators companies. Furthermore, they stated that differentiators tend to use output controls more intensively than cost leaders, which was opposite to the authors' expectations. They suggested that the nature of industry investigated is a possible explanation.

Recently, Auzair (2011) surveyed 59 top management to investigated the use of MCS in Malaysian hotels. The study utilised and modified Auzair and Langfield-Smith

(2005) MCS classification of more/less bureaucratic MCS by adding financial/non-financial information. The study found that hotels pursuing a cost leadership strategy was positively associated with both less and more bureaucratic MCS while hotels following product differentiation strategy was associated with less bureaucratic MCS. The study also found support only for the negative relationship between PEU and less bureaucratic MCS.

Table 3.2 Summary of MCS and Strategy Studies

No.	Author(s), year and Country	MCS conceptualisation	Strategic typology	Method(s) of data collection and sample characteristics	Theoretical framework and variables studied	Fit approach
1	Simons (1987), Canada	Accounting-based controls	Miles and Snow (1978)	76 questionnaires and 12 interviews of CEOs of large manufacturing companies	Contingency theory / Performance, control system attributes, competitive strategy, and industry dynamism	Selection fit approach
2	Govindarajan (1988), USA	Accounting-based controls	Porter (1980)	Questionnaires of 121 SBU general managers of large manufacturing firms	Contingency theory SBU effectiveness, competitive strategy, budget evaluative style, decentralisation, and locus of control	Interaction and Systems fit approach
3	Govindarajan and Fisher (1990), USA	Non-accounting based controls	Porter (1980)	Questionnaires of 121 SBU general managers of large manufacturing firms	Contingency theory and agency theory SBU effectiveness, competitive strategy, type of control, and level of resource sharing	Interaction approach
4	Bruggeman and Van der Stede (1993), Belgium	Accounting-based controls	Porter (1980)	Interviews of18 financial controllers and general managers of medium sized manufacturing and service organisations	Contingency theory 7 aspects of budgeting systems process and competitive strategy	Selection approach
5	Abernethy and Guthrie (1994), Australia	Accounting-based controls	Miles and Snow (1978)	Questionnaires of 49 SBU managers of 2 large diversified manufacturing corporations	Contingency theory (implicitly) SBU effectiveness, SBU strategy, MAI system design	Interaction approach
6	Chenhall and Morris (1995), France, Germany, UK, and the USA	Accounting-based controls	Miller and Friesen (1983) (Conservative and Entrepreneurial)	Questionnaires of 154 SBU general managers of large manufacturing companies	Contingency theory (implicitly) Performance, strategic orientation , organic processes, and the use of MAS	Interaction approach
7	Collins et al. (1997), Central and south Latin America	Accounting-based controls	Miles and Snow (1978)	Questionnaires /128 Latin American accountants and managers of originations from different industries	Contingency theory Budget usage, Crisis (treats), and strategy types	Systems approach
8	Chenhall and Langfield-Smith (1998b), Australia	Accounting-based controls	Porter (1980)	Questionnaires / 78 top management of large manufacturing companies	Contingency theory performance, strategic priorities, management techniques, MAPs	Systems approach
9	Abernethy and Brownell (1999), Australia	Accounting-based controls	Miles and Snow (1978)	Questionnaires/ 63 CEOs of large public hospitals	Contingency theory (implicitly) Performance, strategic change, and style of budget use	Interaction approach

No.	Author(s), year and Country	MCS conceptualisation	Strategic typology	Method(s) of data collection and sample characteristics	Theoretical framework and variables studied	Fit approach
10	Anderson and Lanen (1999), India	Accounting-based controls	Miles and Snow (1978)	Questionnaires and interviews 14 private medium and large manufacturing companies	Contingency theory Performance, competitive strategy, and MAPs	Interaction approach
11	Van der Stede (2000), Belgium	Accounting-based controls	Porter (1980)	Questionnaires/153 business unit managers of large diversified firms	Contingency theory (implicitly) Performance, competitive strategy, budgetary control style, budgetary slack, and managerial time-orientation	Selection and Interaction fit approach
12	Kober et al. (2003), Australia	Hybrid	Miles and Snow (1978)	Documentation, 64 questionnaires, and 9 interviews of managers in one public sector agency	Contingency theory Performance, MCS characteristics, competitive strategy, and perceived environmental uncertainty	Selection and Interaction fit approach
13	Baines and Langfield-Smith (2003), Australia	Accounting-based controls	Change in emphasis on differentiation	Questionnaires/ 141 general managers of large manufacturing companies	Contingency theory Organisational performance, environment, strategy, organisation design, technology, advanced MAPs, and non-financial MAI	Systems fit approach
14	Bisbe and Otley (2004), Spain	Accounting-based controls	Product innovation	Questionnaires/ 58 CEOs of medium sized manufacturing companies	Contingency theory Performance, interactive use of MCS (i.e. budgets, balanced scorecards, project management systems), and product innovation	Interaction and Systems fit approach
15	Hoque (2004), New Zealand	Accounting-based controls	Miles and Snow (1978)	Questionnaires/ 52 CEOs of medium and large sized manufacturing companies	Contingency theory performance, use of non-financial performance measures, business strategy, and environmental uncertainty	Interaction fit approach
16	Jermias and Gani (2004), Indonesia	Hybrid	Porter (1980)	Questionnaires/ 106 general managers, controllers or management accountants of 26 companies under the consumer goods industry	Contingency theory Business unit effectiveness, type of control, type of MAS, competitive strategy, and degree of centralisation	Interaction fit approach
17	Auzair and Langfield-Smith (2005), Australia	Non-accounting-based controls	Porter (1980)	Questionnaires/ 121 financial controllers of profit oriented service organisations	Contingency theory More/ less bureaucratic MCS, service type process, competitive strategy, and organisational life cycle stage	Selection fit approach

No.	Author(s), year and Country	MCS conceptualisation	Strategic typology	Method(s) of data collection and sample characteristics	Theoretical framework and variables studied	Fit approach
18	Naranjo-Gil and Hartmann (2006), Spain	Accounting-based controls	Cost reduction and flexibility strategies	Questionnaires/ 473 response from 92 top management teams (TMTs) of all public hospitals	Contingency theory Strategy implementation, MAS uses (i.e. interactive vs. diagnostic, financial vs. non-financial, performance evaluation vs. resource allocation), and TMTs background	Interaction fit approach
19	Kober et al. (2007), Australia	Hybrid	Miles and Snow (1978)	Documentation, 64 questionnaires, and 9 interviews of managers in one public sector agency	Contingency theory Performance, management information system characteristics and requirements, MCS mechanisms, competitive strategy, and perceived environmental uncertainty	Selection and Interaction fit approach
20	Abdel-Kader and Luther (2008), UK	Accounting-based controls	Porter (1980)	Questionnaires/ 245 management accountants and production managers of food products and beverages	Contingency theory MAPs sophistication, environmental uncertainty, decentralisation, size, operational complexity, AMT, TQM, JIT, competitive strategy, consumers' power, and product perishability	Selection fit approach
21	King et al. (2010), Australia	Accounting-based controls	Porte (1980)	Questionnaires/ 144 medical practice members of the Australian Association of Practice Managers	Contingency theory Performance, budgeting practice, structure, competitive strategy, perceived environmental uncertainty	Interaction fit approach
22	Tsamenyi et al. (2011), China	Accounting-based controls	Porter (1980)	Questionnaires/ 215 finance managers of companies from different industries	Contingency theory Performance, financial and non-financial based MCS, and business strategy	Interaction fit approach
23	Auzair (2011), Malaysia	Hybrid	Porter (1980)	Questionnaires/ 59 top level managers of medium and large hotels	Contingency theory More/less bureaucratic MCS, competitive strategy, and perceived environmental uncertainty	Selection fit approach

3.2.5 Comparison

The contingency theory approach was the dominant approach used by the above empirical studies to investigate the relationships between variables. On the other hand, competitive strategy was classified by adopting and adapting either Porter's (1980) typology of product differentiation and cost leadership or Miles and Snow's (1978) typology of prospector, defender, analyser, and reactor. Most studies collected data utilising a questionnaire survey.

Moreover, the findings from most previous studies were consistent. For instance, the importance of financial and non-financial MAI in relation to strategic priorities and the effect on performance was supported (e.g. Abernethy and Guthrie, 1994, Baines and Langfield-Smith, 2003, Hoque, 2004, Tsamenyi et al., 2011), as well as the emphasis on behaviour controls by companies following product differentiation priorities (e.g. Govindarajan and Fisher, 1990, Jermias and Gani, 2004). However, in some cases, inconsistent findings can be noticed. For example, Simons (1987) found that tight budget control emphasised by prospector companies (or comparatively differentiators), while Bruggeman and Van der Stede (1993) reported that this type of control was appropriate for companies pursuing cost leadership strategy.

3.2.6 Limitations of Previous Studies

From the above empirical literature review, several limitations are identified as follows:

- Most of the studies on MCS were conducted in developed countries, mainly in Australia; whereas there were limited studies in developing countries.

- Most of the studies focused on accounting-based controls in studying MCS, except studies by Auzair and Langfield-Smith (2005), and Govindarajan and Fisher (1990) which utilised non-accounting controls in addressing MCS. Little effort has been made to give a comprehensive view of MCS by taking into account both accounting and non-accounting controls (e.g. Kober et al., 2003, 2007, Auzair, 2011). Hence the need for additional research that considers the

types of MCS in terms of more/ less bureaucratic systems and how these systems are facilitated by MAI.

- Most of the previous studies investigated only a limited number of organisational variables and their potential effects on MCS design. Thus, the potential influence of several contingent variables including centralisation, formalisation, environmental uncertainty, manufacturing complexity, and competitive strategy on the effective MCS design need to be properly examined, as is being attempted in the present study.

- Apart from the study by Kober, Ng, and Paul (2007), none of the other studies reviewed above addressed the possible two-way interaction between MCS and strategy.

- Only a small number of studies used adequate instruments to capture the organisations' competitive strategy (e.g. Chenhall and Langfield-Smith, 1998c, Hoque, 2004, Auzair and Langfield-Smith, 2005), as most utilised a general statement approach to identify the pursued strategy (e.g. Simons, 1987, Govindarajan, 1988, Govindarajan and Fisher, 1990, Kober et al., 2007). Hence the need for properly designed instruments to capture real life companies' competitive strategy and to distinguish between two types of companies, namely cost leaders and differentiators.

- In some studies, a single indicator (e.g. ROS, ROI) was used to measure the outcome variable (e.g. performance, MCS effectiveness), while in other studies the link to this variable was not investigated. The effectiveness of MCS, the dependent variable in the present study, was captured in terms of its adequacy for the company and main purpose for existence; that is strategy implementation.

3.3 Empirical Studies of the Characteristics of MAI

The purpose of this section is to review previous studies of MAI characteristics. A total of 23 studies have been identified, most of them conducted in Australia and published in the 1990s and 2000s (see Table 3.3). The section is organised into seven sub-sections. The next sub-section explains the review criteria. The following four sub-sections review and evaluate the available relevant literature related to the characteristics of MAI. In the sixth sub-section, studies that addressed all four characteristics as one variable are reviewed. Comparison between these studies is provided in the seventh sub-section. The final sub-section summarises the limitations of previous research and identifies the gap in the relevant literature. Table 3-3 summarises further information about these studies.

3.3.1 Evaluation Criteria

This sub-section aims to identify the review criteria. In the following five sub-sections, the relationship between the characteristics of MAI and organisational variables is reviewed. Because the scope dimension was addressed in all studies, apart from studies that combined the effect of all four dimensions, only the next sub-section identifies the studies' methods and the model used to describe the interactions between variables (i.e. moderation, mediation). Each sub-section starts with studies conducted in developed countries and ends with studies in less developed countries, and they are presented in a chronological way.

3.3.2 Scope of MAI

This dimension was investigated in all studies reviewed either individually or collectively with other MAI characteristics.

In developed countries, Chenhall and Morris (1986) interviewed 68 managers in 36 manufacturing companies in Australia, reported that there was only direct relationship between two contingent variables, perceived environmental uncertainty and organisational interdependence, and broad scope of MAI. In contrast, the association between broad scope and the mediator variable, decentralisation, was not supported. Similarly, in 1993, Mia surveyed 70 managers of 8 manufacturing companies

operating in Australia, concluded that as manager's PEU increase, they use more MAI (i.e. broad scope), and this in turn led to improve their performance and increase job satisfaction. The study revealed the mediation part of broad scope of MAI in the relationship between PEU, performance and job satisfaction.

A survey study of 29 marketing and 46 production managers of 5 large manufacturing companies in Australia by Mia and Chenhall (1994), reported that an increased use of broad scope MAI by marketing managers led to enhance their performance, however, this was not the case for their counterpart, production managers. They concluded that functional differentiation of activities (uncertainty) moderates the relationship between managers' use of broad scope MAI and their performance. Chong (1996) surveyed 42 managers of Australian manufacturing companies concluded that when managers use broad scope of MAI under high task uncertainty situations their performance is improved, while in low task uncertainty situations, this use of broad scope affected performance in a negative manner. The study indicated the moderation role of task uncertainty on the relationship between broad scope of MAI and managers' performance.

Again, Fisher (1996) conducted a questionnaire survey of 98 functional managers of large companies from different industries in Australia, reported that only externals locus of controls perceived broad scope of MAI more useful when they face increased environmental uncertainty. The study concluded that locus of control moderated the relationship between PEU and the usefulness of the characteristics of MAI (i.e. scope, timeliness). In 1997, Chong and Chong surveyed 62 SBU managers of manufacturing companies in Western Australia, concluded that SBU strategy (i.e. prospector, defender) and PEU were important determinants of the use of broad scope of MAI, and this use had a positive effect on SBU performance. Hence, they concluded that the design of MAS mediated the relationship between strategy, PEU, and performance.

Similarly, in Australia, Chong (1998) who collected data, using a questionnaire survey, from 63 managers of manufacturing companies, reported that managers with low levels of tolerance for ambiguity tend to use more of broad scope of MAI for

making decisions, which consciously, improves performance, while in high levels of tolerance, managers use less of broad scope MAI in decision making. The study indicated the moderation role of tolerance for ambiguity on the relationship between the use of broad scope MAI and performance.

In New Zealand, Lal and Hassel (1998) surveyed 64 managers of manufacturing companies, concluded that managers of large companies with high tolerance of ambiguity demand broad scope information to deal with increased environmental uncertainty situations. The study reported that tolerance of ambiguity moderates the relationship between environmental uncertainty and the use of scope MAI.

A study of 61 business unit managers of large private manufacturing companies in Australia by Mia and Clarke (1999) reported that increased market competition (uncertainty) was associated with increased use of broad scope MAI and this, as a result, led to improved performance. They concluded that the use of broad scope MAI mediates the interaction between company's market competition and performance.

In Netherlands, Bouwens and Abernethy (2000) surveyed 170 sales and production managers of 85 business units, concluded that there was no relationship between the use of broad scope MAI and strategic priority pursued (i.e. customisation) as well as interdependence. Surprisingly, they found that scope MAI was not important to operational decision making which is inconsistent with prior research (e.g. Mia and Chenhall, 1994). In this context, the study reported that interdependence acts as a mediator on the relationship between strategic priority and the use of MAI. In other words, the association between strategic priorities and scope of MAI appears only indirect through interdependence.

Chong and Eggleton (2003) conducted a survey of 131 senior managers of manufacturing companies in Australia, reported that under conditions of low task uncertainty high use of broad scope MAI by internal managers impact their performance negatively, whereas this use by external managers had no influence on their performance. Their study revealed the moderation role of task uncertainty as well as job relevant information on the association between managers' use of broad scope MAI and performance. In 2006, Stewart et al. surveyed 56 accounting

managers of 3 large Australian food companies, reported that MCS mechanisms (i.e. administrative controls, professional controls) moderate the relationship between broad scope MAI and job relevant information, but not performance. Further, the study found that broad scope MAI affects performance directly as well as indirectly through job relevant information. The study revealed the moderation part of MCS mechanisms and mediation part of job relevant information on the previously mentioned relationships.

In North-Western Finland, Adebayo and Ashley (2007) utilised questionnaire survey to collect data from 78 managers of large and medium manufacturing companies, concluded that increased environmental uncertainty encourage companies to review, and change, their supply chain purchasing policies which, consequently, led to more emphasis on the use of broad scope MAI. The study indicated that supplier development mediates the relationship between PEU and the use of broad scope of MAI.

A survey study of 381 managers of 103 TMTs in all Spanish public hospitals by Naranjo-Gil and Hartmann (2007) found a positive relationship between top management teams heterogeneity and strategic change for organisations moving towards prospector strategy, but not for organisations changing towards defender positions. Their findings support the positive relationship between top management teams heterogeneity and the interactive use of MAS, while no support was found for the relationship between broad scope of MAI and top management teams composition. In addition, they found that broad scope of MAI is positively related to prospector strategic change. The study concluded that the design and use of MAS mediate the relationship between top management heterogeneity and strategic change.

Recently, Mia and Winata (2008) surveyed 76 business unit managers of manufacturing companies operating in Australia, found that managers' use of broad scope MAI is positively associated with JIT and the use of information and communication technology. The findings showed that the relationship between JIT and the use of information and communication technology appears only indirect

through the use of broad scope MAI. Therefore, the study found no support for full or partial mediation.

In less developed countries, Gul and Chia (1994) surveyed 48 managers of companies in Singapore, found that under conditions of high PEU; decentralisation and the availability of broad scope of MAI are associated with high managerial performance, and the opposite was endorsed. The study concluded that PEU and decentralisation moderate the relationship between the characteristics of MAI (i.e. scope, aggregation) and managerial performance. Similarly, Chia (1995) conducted a questionnaire survey of 48 managers of companies operating in Singapore, reported that the positive effects of broad scope of MAI on managerial performance become greater when the degree of decentralisation is high. However, the intensive use of this information in low decentralised organisation had a negative impact on managerial performance. The study indicated the moderation role of decentralisation on the relationship between the characteristics of MAI (i.e. scope, timeliness, aggregation, integration) and managerial performance.

In 1998, Choe interviewed 78 users of MAI in Korean business companies, reported that broad scope of MAI with high user participation had a positive impact on MAS performance in less structured companies, while in structured ones narrow scope of MAI with high user participation is required for performance improvement. Chang et al. (2003) surveyed 126 top management of companies from different industries operating in Taiwan, reported that, under high task situations (i.e. task variability) and in highly decentralised companies, broad scope of MAI endorses user satisfaction. They concluded that both task uncertainty and decentralisation moderate the relationship between the characteristics of MAI (i.e. scope, timeliness, aggregation) and accounting information systems performance.

Recently, Teerooven and Bhagtaraj (2008) surveyed 63 marketing and production managers of manufacturing companies in Mauritius, reported that broad scope of MAI was positively associated with decentralisation and managerial performance, but no support was found for task uncertainty. The study tested the mediation role of MAI

and found support only for the indirect relationship between decentralisation and performance through all four characteristics of MAI.

3.3.3 Timeliness of MAI

In developed countries, Chenhall and Morris (1986) found that timeliness of MAI was associated with PEU, but not with interdependence and decentralisation (i.e. mediator). Fisher (1996) reported that externals locus of controls perceived timely MAI more useful when they confronted by increased environmental uncertainty. In 2000, Bouwens and Abernethy found that only for production managers, not sales managers, there was a significant relationship between customisation and timeliness of MAI.

On the other hand, in developing countries, Chia (1995) concluded that the positive influence of timely MAI on managerial performance become greater in highly decentralised companies, while the opposite relationship found in centralised companies. In 1998, Choe concluded that under high environmental uncertainty circumstances, high MAS performance was positively related to timely MAI via user participation. Similarly, in 2003, Chang et al. reported that timely MAI facilitated user satisfaction in highly decentralised companies.

Recently, Teerooven and Bhagtaraj (2008) found positive relations, on the one hand, between decentralisation and timely MAI, and on the other, between this dimension and managerial performance. In addition, no relationship was found between task uncertainty and timely MAI. They concluded that the positive association between decentralisation and performance appears only indirect through timeliness dimension.

3.3.4 Aggregation of MAI

In a study of Australian manufacturing companies, Chenhall and Morris (1986) reported that decentralisation and interdependence were associated with aggregated MAI. The study found that the effect of interdependence on this dimension was indirect though its relation with decentralisation.

Findings from studies conducted in less developed countries hold similar views regarding this dimension. For instance, Gul and Chia (1994) found that under situations of high PEU, high managerial performance was associated with decentralisation and the availability of aggregated MAI. Again, Chia (1995) reported that the intensive use of aggregated MAI had a positive impact on managerial performance in decentralised companies, whilst this use affected performance negatively in centralised ones. In 1998, Choe reported that there was a positive relationship between high user participation with aggregated MAI and improved MAS performance under high task uncertainty. Similarly, Chang et al. (2003) found that the aggregated MAI facilitated user satisfaction in highly decentralised companies. Recently, Teerooven and Bhagtaraj (2008) found positive relationship between decentralisation and aggregated MAI, and negative association between task uncertainty and this dimension. In addition, aggregated MAI was also positively associated with managerial performance. In sum, there was an indirect relationship between decentralisation and managerial performance through aggregated MAI.

3.3.5 Integration of MAI

A study by Chenhall and Morris (1986), in a mature economy, found that integrated MAI in Australian manufacturing companies was associated with organisational structure (i.e. decentralisation), and organisational interdependence. The effect of interdependence on integrated MAI was, partly, indirect through its relation with decentralisation. Similarly, Bouwens and Abernethy (2000) reported the direct relationship between integrated MAI and the pursued strategic priority (i.e. customisation), as well as indirectly through interdependence.

An early study, in an emerging economy, in Singapore, by Chia (1995) found that the positive effect of integrated MAI on managerial performance become greater when the degree of decentralisation is increased, but the emphasis on this dimension in centralised companies led to a negative impact on performance.

Recently, Teerooven and Bhagtaraj (2008) concluded that integrated MAI is positively associated with decentralisation and managerial performance, but not with

task uncertainty. The positive relationship between decentralisation and managerial performance appears only indirect through its influence on integrated MAI.

3.3.6 Hybrid Studies

This category comprises empirical studies that addressed the characteristics of MAI collectively as one variable. Lal and Hassel (1998) surveyed 64 managers of manufacturing companies in New Zealand, found that managers of large companies with high tolerance of ambiguity require additional useful MAI (i.e. scope, timeliness, aggregation, integration) to deal with increased environmental uncertainty conditions. The study concluded that the effect of environmental uncertainty on useful MAI was moderated by tolerance of ambiguity. Recently, Agbejule (2005) examined the moderating effect of PEU on the relationship between the use of MAI and managerial performance in Finish companies. The study surveyed 69 managers and found that under high levels of PEU the use of MAI had a positive influence on performance, whereas under low levels the use of information had a negative influence. The moderating role of PEU was supported.

More recently, a survey study of 92 TMTs of 218 Spanish public hospitals by Naranjo-Gil (2009) found that the characteristics of MAI (i.e. scope, timeliness, aggregation, integration) assist managers of these organisations to accomplish strategic performance focused on cost reduction and flexibility. They concluded that top management teams diversity moderates the relationship between the characteristics of MAI and strategic performance based on flexibility.

In a comparative study of 51 Chinese and 38 Western managers of 7 large manufacturing companies in China, Tsui (2001) found a negative relationship between MAI (i.e. scope, timeliness) and Chinese managers' performance in high levels of budgetary participation, while this relation was found positive for Western managers under the same conditions. The study concluded that budgetary participation moderate the effect of MAI on managerial performance.

3.3.7 Comparison

The previous studies adopted, and adapted in some occasions, Chenhall and Morris's (1986) instrument to capture the role of MAI (e.g. usefulness, availability, use, importance). Most of these studies aimed at identifying and examining the contingent relationship between variables, although the adoption of contingency theory approach was not explicitly acknowledged in some of these studies. Further, PEU or task uncertainty, and organisational structure (i.e. decentralisation) were the most frequent organisational factors that have been investigated in the previous studies. Furthermore, the moderation or mediation role of the examined variables, either the characteristics of MAI or organisational variable(s), was recognised in most of these studies. The quantitative method (i.e. questionnaire survey) was the dominant method to gather research data.

3.3.8 Limitations of Previous Studies

From the foregoing review of the empirical literature, several limitations are identified as follows:

- Most of the studies focused either on the scope of MAI dimension individually or with one or two other dimensions when addressing the effective design of MAS. In this research, all four MAI dimensions are investigated and examined collectively and individually.

- Most of the studies paid attention to limited organisational variables (e.g. environmental uncertainty, decentralisation) in isolation of other variables (e.g. strategy, technology) that could, interact with the characteristics of MAI and, give a better understanding to the relationship between variables. Therefore, several contingent variables are included in the study theoretical framework to examine their possible influence on MCS and the role of MAI on these relationships.

- In some studies, neither the link to outcome variable (e.g. performance) nor modelling the relationship between variables (i.e. mediation, moderation) was considered. Thus, the mediating role of MAI on the relationship between organisational variables and MCS effectiveness is examined in this study.

- Apart from studies by Chong and Chong (1997) and Bouwens and Abernethy (2000), the role of MAI in strategic priorities was not investigated. Therefore, this study examines the relationship between competitive strategy and the types of MCS as well as the role of MAI in cost leadership and product differentiation priorities.

- Apart from the effort by Teerooven and Bhagtaraj (2008), no study examined the mediating role of all four characteristics of MAI on the relationship between organisational variables and outcome variable (e.g. performance, MCS effectiveness). However, their study was restricted to limited contingent variables. Hence the need to look at a broader set of variables to properly examine these relationships.

- As reported in Gerdin and Greve's (2004) review, some studies that actually used the mediation variable model incorrectly tried to look for consistency or contrast of their findings with other studies that tested for moderation (e.g. Chong and Chong, 1997, Chong and Eggleton, 2003).

- Finally, some studies reported the *mediating* role of a third variable (e.g. MAI) whereas in fact their findings showed the *indirect* effect of the independent variable on the dependent variable through that third variable (e.g. Mia, 1993, Teerooven and Bhagtaraj, 2008).

Table 3.3 Summary of the Characteristics of MAI Studies

No.	Author(s), year and country	Characteristics of MAI	Method(s) of data collection and sample characteristics	Mediating / Moderating model	Theoretical framework and variables studied	Fit approach
1	Chenhall and Morris (1986), Australia	All	Structured questionnaires/ 68 managers of medium size manufacturing companies	Mediating / decentralisation	Contingency theory Perceived usefulness of MAS, external environmental uncertainty, interdependence, and decentralisation	Interaction fit approach
2	Mia (1993), Australia	Scope	Questionnaires/ 70 managers of 8 large manufacturing companies	Mediating / use of MAI	Contingency theory Managerial performance, perceived environmental uncertainty, use of MAI, and job satisfaction	Interaction fit approach
3	Gul and Chia (1994), Singapore	Scope and aggregation	Questionnaires/ 48 managers of companies from different industries	Moderating / PEU and decentralisation	Contingency theory Managerial performance, MAS sophistication, PEU, and decentralisation	Interaction fit approach
4	Mia and Chenhall (1994), Australia	Scope	Questionnaires/ 75 marketing and production managers of 5 large manufacturing companies	Moderating / functional activities	Contingency theory (implicitly) Managerial performance, use of broad scope MAI, and functional activities	Interaction fit approach
5	Chia (1995), Singapore	All	Questionnaires/ 48 managers of companies from different industries	Moderating / decentralisation	Contingency theory Performance, MAS sophistication, and decentralisation	Interaction fit approach
6	Chong (1996), Australia	Scope	Questionnaires/ 42 managers of medium and large manufacturing companies	Moderating / task uncertainty	Contingency theory Managerial performance, broad scope MAI, and task uncertainty	Interaction fit approach
7	Fisher (1996), Australia	Scope and timeliness	Questionnaires/ 98 managers of large companies from different industries	Moderating / locus of control (LOC)	Contingency theory (implicitly) Perceived usefulness of MAI, PEU, and LOC	Interaction fit approach
8	Chong and Chong (1997), Australia	Scope	Questionnaires/ 62 strategic business unit (SBU) mangers of medium and large manufacturing companies	Mediating / scope MAI	Contingency theory (implicitly) SBU performance, SBU strategy, PEU, and broad scope MAI	Systems fit approach

No.	Author(s), year and country	Characteristics of MAI	Method(s) of data collection and sample characteristics	Mediating / Moderating model	Theoretical framework and variables studied	Fit approach
9	Choe (1998), South Korea	Scope, timeliness and aggregation	Structured questionnaires/ 450 users of MAI in 78 business firms	Moderating / (implicitly) MAI characteristics	Contingency theory User MAS satisfaction, task uncertainty, user participation in MAS design, and organisational structure	Interaction fit approach
10	Chong (1998), Australia	Scope	Questionnaires/ 63 managers of manufacturing companies	Moderating / tolerance for ambiguity	Contingency theory Managerial performance, broad scope of information, and tolerance for ambiguity	Interaction fit approach
11	Lal and Hassel (1998), New Zealand	All	Questionnaires/ 64 managing directors of small and large manufacturing companies	Moderating / tolerance of ambiguity	Contingency theory Perceived usefulness of MAI, PEU, tolerance of ambiguity	Interaction fit approach
12	Mia and Clarke (1999) Australia	Scope	Structured questionnaires/ 61 business unit managers of large manufacturing companies	Mediating / use of MAI	Contingency theory (implicitly) Business unit performance, intensity of market competition, and use of MAI	Selection and Interaction fit approach
13	Bouwens and Abernethy (2000), Netherlands	All	Questionnaires/ 170 production and sales managers of 85 large manufacturing and service companies	Mediating / interdependence	Contingency theory (implicitly) The importance of MAI dimensions, customisation, and interdependence	Selection and Interaction fit approach
14	Tsui (2001), China	Scope and timeliness	Questionnaires/ 89 Chinese and Western managers of 7 large manufacturing companies	Moderating / budgetary participation	Contingency theory Managerial performance, availability levels of MAI, cultural background, and budgetary participation	Interaction fit approach
15	Chang et al. (2003), Taiwan	Scope, timeliness and aggregation	Questionnaires/ 126 managers of manufacturing and service companies	Moderating / task uncertainty and decentralisation	Contingency theory MAS user satisfaction, MAI characteristics, task variability, task analysability, and decentralisation	Interaction fit approach
16	Chong andEggleton (2003), Australia	Scope	Questionnaires/ 131 senior managers of large manufacturing companies	Moderating / task uncertainty and LOC	Contingency theory and social learning theory Managerial performance, use of broad scope MAI, task uncertainty, and LOC	Interaction fit approach

No.	Author(s), year and country	Characteristics of MAI	Method(s) of data collection and sample characteristics	Mediating / Moderating model	Theoretical framework and variables studied	Fit approach
17	Agbejule (2005), Finland	All	Questionnaires/ 69 managers of 11 manufacturing companies	Moderating/ PEU	Contingency theory Managerial performance, use of MAI, and PEU	Interaction fit approach
18	Stewart et al. (2006), Australia	Scope	Questionnaires/ 56 managers of 3 large manufacturing food companies	Moderating / managerial control Mediating / job relevant information	Contingency theory Managerial performance, job relevant information, broad scope MAS, and managerial control	Interaction fit approach
19	Agbejule and Burrowes (2007), Finland	Scope	Questionnaires/ 78 purchasing managers of medium and large manufacturing companies	Mediating / supplier development	Contingency theory (implicitly) Use of broad MAI, PEU, and supplier development	Selection and Interaction fit approach
20	Naranjo-Gil and Hartmann (2007), Spain	Scope	Questionnaires/ 381 response from 103 TMTs of all public hospitals	Mediating / The design and use of MAS	Contingency theory Strategic change, TMT heterogeneity, interactive use of MAS, and broad scope MAI	Interaction fit approach
21	Mia and Winata (2008), Australia	Scope	Questionnaires/ 76 business units general managers of manufacturing companies	Mediating / scope MAI	Contingency theory (implicitly) Use of information and communication technology, JIT application, size, and MAI use	Interaction fit approach
22	Teerooven and Bhagtaraj (2008), Mauritius	All	Questionnaires/ 63 marketing and production managers of large textile and wearing apparel manufacturing companies	Mediating / the characteristics of MAI	Contingency theory Managerial performance, task uncertainty, decentralisation, and MAI dimensions	Systems fit approach
23	Naranjo-Gil (2009), Spain	All	Questionnaires/ 473 response from 92 TMTs of all public hospitals	Moderating / TMTs diversity	Contingency theory Strategic performance, sophisticated MAI, and TMTs diversity	Interaction fit approach

3.4 Summary and Conclusion

This chapter has offered reviews of two stands of relevant empirical research, one that deals with the relationship between MCS and contingent variables paying a particular attention to competitive strategy, and the other concerns the relationship between contingent variables and MAI.

Within the MCS contingency relationships, studies were grouped into three categories according to their MCS conceptualisation, and therefore accounting controls were the most popular classification of MCS. In addition, Porter's typology was the most present in the reviewed studies.

Similarly, five categories of MAI studies were reviewed and scope of MAI was the most widely investigated dimension either individually or with the other three dimensions. In these studies, the moderator variable and the mediator variable was investigated, and MAI was mostly found as a mediator variable or an outcome variable to the investigated relationships but not as a moderator variable.

Informed by the literature reviews in this and the previous chapter, the study's research hypotheses, philosophy and instruments are presented and explained next.

Chapter Four
Research Methodology

4.1 Introduction

The overall design of this research was outlined in Chapter one. This chapter presents the research hypotheses in relation to the research objectives and questions described in Chapter one, the research philosophy and methodology adopted, and the specific research methods and procedures to collect the research data.

4.2 Research Objectives

As mentioned in Chapter one, the main aim of this research is to examine the role of MAI in facilitating MCS in large manufacturing companies in Libya. To achieve this, the research has the following four objectives:

1. To examine the strategy formulation process in large manufacturing companies in Libya, and the role of MAI in this process.
2. To identify the perceived usefulness of MAI in these companies.
3. To identify the types of MCS, their relationship with competitive strategy and effectiveness in these companies.
4. To examine the relationship between contingent variables and the effectiveness of MCS, and the role of MAI usefulness in these relationships.

4.3 Research Questions

To achieve the above objectives, this study attempts to answer the following research questions:

1. How do companies formulate their intended strategies?
2. What is the role of MAI in relation to cost leadership priorities?
3. What is the role of MAI in relation to differentiation priorities?
4. How do managers perceive MAI usefulness in these companies?

5. What types of MCS are used in these companies, how are they influenced by competitive strategy, and how effective are they?

6. How do contingent variables affect MCS effectiveness, and does MAI usefulness mediate these relationships?

4.4 Research Hypotheses

Based on the review of the available relevant literature of MAS/MCS and strategy (see Chapters Two and Three) and the resultant research objectives and questions, sixteen hypotheses have been formulated for this study. These are presented below. Table 4.1 summarises the hypotheses into three groups and links them to the research objectives and questions. Essential elements of the literature review (see Chapters Two and Three) are reproduced in the sections below to substantiate each of the hypotheses.

Table 4.1 Link between Research Hypotheses, Objectives and Questions

Hypotheses groups	Objective(s)	Question(s)
1. Cost leaders and product differentiators characteristics		
Hypothesis 1	1	1
Hypothesis 2	1	2
Hypothesis 3	1	3
Hypothesis 4	2	4
Hypothesis 5	3	5
Hypothesis 6	3	5
2. Organisational characteristics and MCS effectiveness		
Hypothesis 7	4	6
Hypothesis 8	4	6
Hypothesis 9	4	6
Hypothesis 10	4	6
Hypothesis 11	4	6
3. ***Mediating Role of MAI***		
Hypothesis 12	4	6
Hypothesis 13	4	6
Hypothesis 14	4	6
Hypothesis 15	4	6
Hypothesis 16	4	6

4.4.1 Cost Leaders and Product Differentiators' Characteristics

This first group of hypotheses is concerned with addressing the differences between companies that are classified as cost leaders and others as product differentiators in relation to the process of strategy formulation, MCS types and the usefulness of MAI.

4.4.1.1 Strategy Formulation

Strategy formulation, or strategic process, refers to the managerial activities involved in shaping goals and expectations as well as facilitating the organisation's actions in order to accomplish these goals. These procedures and actions implicitly take into account strategy implementation in early stages of this process as splitting strategy formulation from implementation led to a lack of understanding of the nature of MCS (Simons, 1990, Langfield-Smith, 1997).

According to Porter (2010), a company's strategy is about combining activities, such as calling on customers, assembling final products, and training employees. He emphasised that the process of formulating strategy involves choices related to which activities need to be performed, how to arrange individual activities and most importantly how these activities are linked to one another. In addition to these actions, companies should identify strategies that align their resources and capabilities to the competitive environment prevailing conditions. In other words, companies' strengths and weaknesses as well as the opportunities and threats in the environment should be taken into consideration when formulating the strategy (Demirbag et al., 2010).

Several terms have been used interchangeably in the strategic management literature to refer to the strategy formulation process, including strategic decision making process and strategic planning process. Dent (1990, p. 8) stated that "strategy making is depicted as a linear, sequential, orderly activity initiated by a powerful executive or group. It relies on rational techniques for analysing environments and organizational resources, generating action alternatives and appraising these against unitary, consistent preferences".

In this context, the deciding characteristic of the strategy formulation process is "that the process is not just cerebral but formal, decomposable into distinct steps, delineated

by checklists, and supported by techniques (especially with regard to objectives, budgets, programs, and operating plans)"(Mintzberg and Lampel, 1999, p. 22). Porter (1980) argued that cost leaders are seen as continually focusing on activities that are related to, for example, costs and production system efficiency, whereas differentiators are less attracted to these activities, and the key to their success is a focus on, for example, quality and service. He emphasised that cost leaders and differentiators cannot totally ignore each other's activities.

Based on the above discussion, this study focuses on the formality versus informality (i.e. flexibility) of the organisational strategy formulation process. The intention is to identify the difference between companies that have been classified as cost leaders and differentiators in terms of strategy formulation process. Therefore, it is hypothesised that

H1 There is significant difference between cost leaders and differentiators in the strategy formulation process.

4.4.1.2 Strategic Role and Usefulness of MAI

Existing research evidence pointed out that the growing role of MAI in formulating as well as implementing organisational strategy increases the demand of relevant information. For example, Mia and Chenhall (1994) concluded that the increasing role of MAI to aid managers in decision making and problem solving has expanded the nature of the required information. This led to a shift from relying only on financial information internal to the organisation and historically oriented to also include external and non-financial information that focuses on marketing, innovation, strategic planning and predictive data related to these decision areas. Similarly, Chenhall and Morris (1995) reported that the extensive use of MAI enhanced to a greater extent the performance of companies that follow an entrepreneurial strategy than their counterpart who follow a conservative strategy. In addition, Mia and Clarke (1999) found a positive relationship between market competition and the use of MAI which resulted in performance improvement. On the other hand, Naranjo-Gil and Hartmann (2006) who studied the influence of TMTs usage of MAI on strategy

implementation concluded that teams background affect their use of MAI which in turn influences the strategic priorities implementation. However, Bouwens and Abernethy (2000) found that scope of MAI was not important to operational decision making. Thus given the emphasis in most of previous research on the positive role that MAI can play regardless of the strategic priorities being pursued, it is hypothesised that

H2 MAI plays an important role in cost leadership priorities.

H3 MAI plays an important role in product differentiation priorities.

Notable MAS/MCS and strategy literature reviews (e.g. Chenhall, 2007, Langfield-Smith, 2007) suggest that certain types of MAI will be appropriate for a particular strategic priorities. It was found that companies that follow strategies of prospectors/build/product differentiators require more sophisticated information systems than companies who follow strategies of defender/harvest/cost leadership. For instance, Abernethy and Guthrie (1994) concluded that companies adopted prospector priorities benefit more from MAI compared to companies pursued defender priorities in relation to organisational performance. Chenhall and Langfield-Smith (1998c) found that companies following a product differentiation strategy benefit from all management techniques and utilised contemporary MAPs, whereas companies adopting cost leadership strategy implemented few management techniques and relied less on advanced practices compared to traditional accounting techniques.

On the other hand, recent research suggests a different view of MAI relevance. For instance, Naranjo-Gil and Hartmann (2006) reported that financial MAI is important for cost reduction strategic priorities as well as flexibility strategic priorities, and non-financial information supported the strategy implementation regardless of the strategy being adopted. Recently, Abdel-Kader and Luther (2008) expected that firms following differentiation strategy adopt more sophisticated MAPs than firms following cost leadership strategy. Their results revealed no difference between product differentiators and cost leaders in relation to the level of sophistication of MAPs. These mixed views in the literature in relation to which type of MAI is

suitable for a particular competitive position indicate not only the importance of MAI but also highlight its context-dependent relevance in more recent years (e.g. Jermias and Gani, 2004). In the light of the above findings and views, it is hypothesised that

H4 There is significant difference between cost leaders and differentiators in the usefulness of MAI.

4.4.1.3 Choice of MCS Type

The design and adoption of MCS types significantly depends on the strategic priorities being pursued by companies. Empirical evidence indicates that companies following a cost leadership strategy utilise different types of MCS than those used by companies pursuing differentiation strategy (e.g. Chenhall, 2007, Langfield-Smith, 2007). For instance, Miller (1988) found a positive relationship between cost leadership priorities and two types of MCS, namely formal and restricted. Also according to Bruggeman and Van der Stede (1993) tight controls is more appropriate for companies employing strategy of cost leadership and companies following differentiation strategy who produces standard products. In addition, they found that loose control is optimal for differentiators who based their strategy on production flexibility. However, Simons (1987) found that successful prospectors (differentiators) tend to use their financial control systems more intensively than defenders (cost leaders) which contradict with most previous research findings and has been acknowledged in literature reviews (e.g. Langfield-Smith, 1997).

A study by Jermias and Gani (2004) found that product differentiators utilised behaviour controls as well as output controls more than cost leaders, which was opposite to their expectations. Auzair and Langfield-Smith (2005) concluded that cost leaders firms tend to place emphasis on more bureaucratic MCS (i.e. action, formal, tight, restricted, and impersonal controls), while their counterpart, the differentiators, placed emphasis on less bureaucratic MCS (i.e. results, informal, loose, flexible, and interpersonal controls).

Most previous management accounting research suggests a positive relationship between competitive strategy and the adopted MCS types, and also agrees that certain types of MCS are more appropriate for cost leader companies than for differentiators. It is therefore hypothesised that

H5 Competitive strategy influences the adoption of MCS types.

H6 There is significant difference between cost leaders and differentiators in the adoption of MCS types.

4.4.2 Influence of Organisational Characteristics on MCS Effectiveness

This second group of hypotheses focuses on the relationship between the investigated contingent variables and the effectiveness of MCS.

4.4.2.1 Centralisation

Centralisation, as a dimension of organisational structure, is concerned with the degree of delegating authority to make decisions affecting the organisation (Pugh et al., 1968). The link between MCS and centralisation was explained by Child (1973) as one possible strategy to control activities is to centralise decision-making authorities at higher levels within organisations , and this will reduce the need for systems, procedures and specialists to guide the administrative systems. In addition, centralisation has been addressed in the MAS/MCS literature either explicitly or implicitly by looking at its inverse dimension; that is decentralisation.

Early as well as more recent empirical research suggests the existence of a positive relationship between the level of centralisation (decentralisation) and organisational performance and systems performance. For instance, Bruns and Waterhouse (1975) found that managers of highly structured organisations were more involved in budget planning and satisfied with budget-related behaviour, whereas those in organisations where authority is concentrated received budgets less useful and limited their flexibility. Similarly, Merchant (1981) reported that managers in large decentralised companies tend to participate more in preparing budgets on a formal level and

attached more emphasis to meet their targets which resulted in a good organisational performance. Gul and Chia (1994), and Chia (1995) reported that MAI has a positive influence on managerial performance as the degree of decentralisation increase. Also Chang, Chang, and Paper (2003) found that companies who authorised and delegated decision making to the lower levels of the company's hierarchy satisfied MAI users, and this reflected on the effectiveness of MAS. Recently, Teerooven and Bhagtaraj (2008) found a positive relationship between decentralisation and managerial performance through MAI. More recently, King et al. (2010) reported that the use as well as the extent of use of written budgets is positively associated with decentralised organisations. The findings from previous research indicate that in situations where levels of centralisation are low, this is expected to have a positive influence on MCS effectiveness and vice versa, in the presence/absence of relevant information.

Based on the above discussion, it is hypothesised that

H7 Centralisation, as an aspect of organisational structure, influences the effectiveness of an MCS.

4.4.2.2 Formalisation

Organisational formalisation specifies the extent to which rules, procedures, instructions and communications are written to prescribe behaviour (Pugh et al., 1968, Hage and Aiken, 1969). Tight control where rules and control procedures are embedded within organisational routines and systems is associated with highly formalised organisations. In this context, regular monitoring of the organisational actions is required to achieve a successful implementation to the desired goals (Nicolaou, 2000).

There are not many management accounting studies that have addressed the relationship between formalisation and MAS/MCS. The available empirical evidence so far supports the positive influence of this contingent variable on the effective design and use of MCS. In this regard, Fredrickson (1986) concluded that the degree of formalisation influences the strategic decision making process. In addition, Nicolaou (2000) found that organisational formalisation, among other internal

dependence, had a significant effect upon the organisational coordination and control requirements that should be met by the system design. Also Gerdin (2005) found some support to the combined effect of departmental interdependence and organisational structure (e.g. formalisation) on the effective design of MAS. Based on the above, it is hypothesised that

H8 Formalisation, as an aspect of organisational structure, influences the effectiveness of an MCS.

4.4.2.3 Environmental Uncertainty

A powerful contextual variable at the foundation of contingency-based research is the external environment, and uncertainty is the most widely addressed aspect of the environment. Recent MCS contingency-based research has emphasised the importance of uncertainty as a fundamental variable (e.g. Chapman, 1997, Chenhall, 2003, 2007).

Environmental uncertainty has been related to the usefulness of MAI in MCS research by explicitly addressing the characteristics of MAI or implicitly by investigating the practices of MAS (e.g. Gordon and Narayanan, 1984, Govindarajan, 1984, Chenhall and Morris, 1986, Mia, 1993, Gul and Chia, 1994, Mia and Chenhall, 1994, Chong and Chong, 1997, Mia and Clarke, 1999, Baines and Langfield-Smith, 2003, King et al., 2010). Most of the studies reported that under high environmental uncertainty situations, decision makers demand more information to decrease the level of ambiguity and take the desired actions in order to accomplish their organisation's targets. For example, Chenhall and Morris (1986) found a positive relationship between perceived environmental uncertainty and two dimensions of MAI; scope and timeliness. Moreover, Fisher (1996) concluded that external locus of controls perceived broad scope of MAI more useful when they face increased environmental uncertainty.

However, Teerooven and Bhagtaraj (2008) found no relationship between task uncertainty and scope, timeliness, and integrated MAI, but this relation was found negative with aggregated information. In addition, King et al.(2010) found a negative

relationship between the extent of use of written budgets and environmental uncertainty.

Given the above mixed views on the nature of the relationship between environmental uncertainty and MCS, and given the actions taken by the Libyan government since the late 1980s and more so recently to gradually liberate the market, large companies operating in Libya are expected to face more uncertain situations. The effect of this on the effectiveness of MCS is hypothesised as follows:

H9 Environmental uncertainty influences the effectiveness of an MCS.

4.4.2.4 Manufacturing Process Complexity

Manufacturing process complexity is one of three important generic types of technology to the design of MCS in the organisational literature. Companies producing non-standard, differentiated products are more likely to employ complex unit or batch technologies. Traditional MCS, which are based on financial controls, would not be appropriate for these technologies. On the other hand, companies that produce standardised, undifferentiated products tend to employ mass production and process technologies. These circumstances require standardised, administrative MCS such as traditional formal financial controls (Chenhall, 2007).

Available empirical management accounting research indicates either positive or no relationship between manufacturing process complexity and the effective design and use of MCS. For example, Krumwiede (1998) found a positive association between the level of manufacturing process complexity and the adoption as well as the implementation of sophisticated MAP. In contrast, Abdel-Kader and Luther (2008) reported no relationship between production complexity and the level of MAPs sophistication.

Other management accounting studies linked the change of this variable to changes in other related circumstances and how this at the end affects the organisational performance and systems performance. In this respect, Bruggeman and Slagmulder (1995) argued that companies could introduce new technologies in order to improve

their competitive advantage. This introduction possibly requires companies to change the manufacturing process as well as the existing MAS/MCS to be sufficient and effective. Similarly, Baines and Langfield-Smith (2003) found that the change in the competitive environment simultaneously accompanied by changes in: strategic priorities, organisational design, manufacturing technology, and more reliance on non-financial MAI. These changes resulted in enhancing organisational performance. Therefore, consistent with the above discussion, it is hypothesised that

H10 The level of manufacturing process complexity influences the effectiveness of an MCS.

4.4.2.5 Competitive Strategy

The important and strong relationship between competitive strategy and MCS has been highlighted in many earlier and recent reviews (e.g. Dent, 1990, Langfield-Smith, 1997, Chenhall, 2003, Langfield-Smith, 2007). This relation is based on the notion that when pursing competitive advantage, many companies are likely to implement administrative functions (e.g. MAS/MCS) that support their particular strategic priorities (Chenhall and Langfield-Smith, 1998c). The MCS and strategy literature presented various typologies to describe the generic competitive strategies of companies (e.g. Miles and Snow, 1978, Porter, 1980).

With the exception of the negative influence of competitive strategy on MCS, relevant empirical evidence on the nature of the relationship that exists between competitive strategy and the effective design and use of MCS varies from positive, indirect to no relationships. For instance, Govindarajan (1988) found that high performing companies following differentiation priorities are associated with low emphasis on meeting budgets. Also Abernethy and Brownell (1999) reported that the interactive use of budgets had a positive influence on the relationship between the strategic priorities and organisational performance. Kober et al. (2003) found a positive association between MCS mechanisms and strategic priorities change, and suggested that a good match between MCS and strategy leads to improvement in organisational performance.

Jermias and Gani (2004) concluded that business unit effectiveness is improved as a result of the match between the organisational factors regardless of the adopted strategic priorities. Naranjo-Gil and Hartmann (2006) found that the types of strategic priorities influence the required MAI to successfully implement the chosen priorities. Kober et al. (2007) found support for the two-way interaction between MCS and strategy through a longitudinal study. However, Hoque (2004) reported the existence of significant positive relationship between strategic priorities and performance only through the use of non-financial indicators by managers. In contrast, Amoako-Gyampah and Acquaah (2008) found no relationship between competitive strategy and company performance. There is therefore enough evidence in the extant literature to safely hypothesise that

H11 Competitive strategy influences the effectiveness of an MCS.

4.4.3 The Intervening Role of MAI on the Relationship between Organisational Characteristics and MCS Effectiveness

The previous group of hypotheses sought to discover the relationship between contingent variables (the independent variables) and MCS effectiveness (the dependent variable). The intervening variable model[3], in general, and the mediating role of MAI on the relationship between organisational variables and organisational performance/managerial performance/MAS performance, in particular, has been widely investigated in the MAS/MCS literature. Environmental uncertainty was the most widely investigated contingent variable in relation to the mediating role of MAI. For instance, Mia (1993) reported the mediating role of scope of MAI on the relationship between perceived environmental uncertainty and managerial performance and job satisfaction. Similarly, Mia and Clarke (1999) found that an increase in the market competition increased the use of MAI which in turn led to performance improvement. Chong and Chong (1997) found that competitive strategy and environmental uncertainty were important antecedents to the use of broad scope of MAI and this in turn had a positive influence on performance. With respect to the

[3] Intervening role is a broad term which refers to one of three scenarios: full mediation, partial mediation, or indirect interaction.

centralisation variable, Teerooven and Bhagtaraj (2008) found a positive indirect association between decentralisation and managerial performance. This association only appears via the availability of broad scope MAI. In relation to the manufacturing process complexity, Mia and Winata (2008) reported that the influence of advanced production methods (e.g. JIT) on the use of information and communication technology appears only indirect through scope of MAI.

Based on the arguments made in the context of hypotheses **H7-H11** and the summary of relevant literature above, it is assumed that the usefulness of MAI plays a mediating role that sheds light on the nature of the relationship that exists between each of the investigated contingent variables and the effectiveness of MCS. Therefore, it is hypothesised that

H12 The usefulness of MAI has a mediating effect on the relationship between centralisation and the effectiveness of MCS.

H13 The usefulness of MAI has a mediating effect on the relationship between formalisation and the effectiveness of MCS.

H14 The usefulness of MAI has a mediating effect on the relationship between environmental uncertainty and the effectiveness of MCS.

H15 The usefulness of MAI has a mediating effect on the relationship between level of manufacturing process complexity and the effectiveness of MCS.

H16 The usefulness of MAI has a mediating effect on the relationship between competitive strategy and the effectiveness of MCS.

The next two sections present and discuss the research philosophy and methodology.

4.5 Research Philosophy

Research paradigm or philosophy is a "philosophical framework that guides how scientific research should be conducted" (Collis and Hussey, 2009, p. 55). The research philosophy that the researchers adopt comprises important assumptions regarding how they view the world. These assumptions support the research's strategy

and methods that researcher choose as part of that strategy (Creswell, 2009). In addition, determining and understanding the research philosophy is considered as a starting point in and central to the research design (Easterby-Smith et al., 2002).

Easterby-Smith et al. (2008) identify three important reasons for the usefulness of understanding the philosophical issues. First, this assists in clarifying the research designs. Second, it can help researchers to recognise the appropriate designs, and the third reason is to help researchers in identifying and creating designs which might be outside of their earlier experience as well as suggesting ideas of how to adapt the research designs to different conditions.

According to Collis and Hussey (2009), Easterby-Smith et al. (2008), and Saunders et al.(2009), social science research design could be derived from two main philosophies or paradigms. These frameworks are positivism and interpretivism (or social constructionism). Positivism was the underpinning paradigm for conducting early natural sciences research as well as much of today's social sciences research. Within this philosophy, the assumption is that social reality is independent of the researcher and objective methods should be used to measure its properties. In contrast, interpretivism (or social constructionism), which developed as a result of the criticisms of the positivism paradigm, is supported by the idea that social reality is part of the researcher (i.e. in his or her mind), and subjectively measured (Easterby-Smith et al., 2008, Collis and Hussey, 2009).

Under the positivism paradigm, the task of social research is to gather facts and measure how certain patterns occur, therefore it looks for external causes and fundamental laws to explain behaviour, whereas in the interpretivism paradigm the task is to explain and understand the difference in meanings and constructions that people place upon their past experience (Easterby-Smith et al., 2002). In addition, positivism paradigm implies the quantitative, objective, scientific, and traditionalist approach; whereas the interpretivism paradigm implies the qualitative, subjective, humanist, and phenomenological approach (Collis and Hussey, 2009).

Collis and Hussey (2009) argue that since the positivism paradigm assumes that the social phenomena could be measured, this explicitly means that this paradigm is more

likely to be associated with quantitative methods of analysis. They concluded that interpretive research is any type of research where its findings are not derived from statistical analysis of data collected using the quantitative approach. However, when researchers think that one research paradigm is right or better than the other, certainly they would omit the point that they are better at doing different things (Saunders et al., 2009). A brief description of the implications of the two paradigms is illustrated in Table 4.2 below.

Table 4.2 Implications of the Positivism and Interpretivism Paradigms

	Positivism	**Social constructionism**
The observer	must be independent	is part of what is being observed
Human interests	should be irrelevant	are the main drivers of science
Explanations	must demonstrate causality	aim to increase general understanding of the situation
Research progresses through	hypotheses and deductions	gathering rich data from which ideas are induced
Concepts	need to be defined so that they can be measured	should incorporate stakeholder perspectives
Units of analysis	should be reduced to simplest terms	may include the complexity of 'whole' situations
Generalisation through	statistical probability	theoretical abstraction
Sampling requires	large numbers selected randomly	small numbers of cases chosen for specific reasons

Adopted from Easterby-Smith et al.(2008, p.59)

Recently, Collis and Hussey (2009), Creswell (2009), and Saunders et al. (2009) identified *pragmatism* as another paradigm in addition to the previous two paradigms. According to this paradigm the pragmatists are not restricted to any one system of philosophy when they are involved in doing research (i.e. use mixed methods research), and researchers should stop asking questions about reality and lows of nature. Thus, instead of focusing on which position is better to adopt, the research problem is most important as well as taking advantage of all available approaches to understand the problem, build knowledge about it, and find solution for it.

Amaratunga et al. (2002) provide a summary of strengths and weakness to the two main research paradigms. These characteristics could be useful in guiding the researcher to recognise and choose the appropriate methodology, and methods for their research project. Table 4.3 below summaries these distinctive features.

Table 4.3 Strengths and Weaknesses of the Positivism and Interpretivism

Paradigm	Strengths	Weaknesses
Positivism *(quantitative)*	• They can provide wide coverage of the range of situations • They can be fast and economical • Where statistics are aggregated from large samples, they may be of considerable relevance to policy decisions	• The methods used tend to be rather inflexible and artificial • They are not effective in understanding processes or the significance that people attach to actions • They are not very helpful in generating theories • Because they focus on what is, or what has been recently, they make hard for policy makers to infer what changes and action should take place in the future
Interpretivism *(qualitative)*	• Data-gathering seen more as natural than artificial • Ability to look at change processes over time • Ability to understand people's meaning • Ability to adjust new issues and ideas as they emerge • Helpful in theories generation	• Collecting data could be tedious and require extra resources • Analysing and interpreting data could be more difficult • Difficulties in controlling pace, progress and the research end-points • Low credibility may be given to the results by policy makers

Adapted from Amaratunga et al. (2002)

Saunders et al. (2009) stated that the more researchers are conscious of the theory at an early starting point of their research study (i.e. research design) the more they are able to use a deductive or an inductive approach. The former approach is concerned with designing a research strategy to develop a theory and hypothesis as well as to test hypothesis, whereas in the latter approach, the researcher is concerned about collecting data and developing theory based on results obtained from analysing data. Furthermore, they linked the deductive approach to positivism, while the inductive approach to interpretivism.

The adoption of a specific research paradigm is influenced by the research problem, researcher's personal experiences, and the audiences for whom he or she seeks to report (Creswell, 2009). In this respect, Creswell (2003), and Saunders et al. (2009) argue that there are a number of criteria that determine whether the research will be deductive or inductive. They indicated that a research topic with a wealthy literature where the researcher can define a theoretical framework and a hypothesis is more

likely to follow a deductive approach. On the other hand, new research topic within areas with not much existing literature, the inductive approach is suggested to be more appropriate. They mentioned other relevant important considerations that include the time available to the researcher and the extent to which they are ready to accept the risk; pointing out that deductive research can be quicker to complete and lesser risk compared to inductive research.

Consequently, for the design of this research study it was decided to adopt a positivistic paradigm. The following reasons justify this decision:

- Positivism is still the dominant paradigm in many areas of business and management research. In addition, the researcher does not have to spend more time and expend much energy to explain and justify their research's methodology and methods as long as this paradigm is accepted in the research discipline and by the research supervision team (Collis and Hussey, 2009).

- The research topic of this study, which is relatively a literature wealthy topic, and its objectives (see Section 4.2), which seeks to identify the MCS used in manufacturing companies in Libya and to examine the relationship between MAS/MCS and strategy as well as other research variables using an existing theory, the contingency theory. Therefore, the positivistic paradigm was considered as appropriate for this research study.

4.6 Research Methodology

After deciding the research paradigm, the researchers can choose a methodology that reflects the philosophical assumptions of their paradigm (Collis and Hussey, 2009). The term strategies of inquiry, approaches to inquiry, and research methodologies are used interchangeably (Creswell, 2009).

Creswell (2009) identifies three approaches that the strategies of inquiry (i.e. methodology) can be derived from. He linked each approach to paradigms and methods of data collection and analysis in order to assess the researchers choosing the suitable approach for their research. These are: quantitative, qualitative, and mixed methods approach.

- Quantitative approach: The researcher adopts a positivistic paradigm and uses strategies of inquiry such as experiments and surveys, employs predetermined instruments for collecting data, and uses statistical techniques to analyse the data.

- Qualitative approach: The investigator uses interpretivism or the social constructionism philosophy. Different methodologies could be used within this approach such as ethnographies, grounded theory studies, case studies, phenomenological, and narrative research. The researcher collects open-ended and emerging data with the intention to develop themes from that data.

- Mixed methods approach: The researcher tends to adopt the pragmatic paradigm, and uses a combination of strategies of inquiry. Hence, collecting data involves both quantitative information (e.g. instruments) as well as qualitative information (e.g. interviews).

Based on the discussion above, and taking into account the adopted research paradigm, questions, and objectives, this research study adopted the quantitative approach. Consequently, a survey method (i.e. cross-sectional questionnaire survey) was adopted as the research strategy of inquiry. Bryman and Bell (2007, p. 56) indicated that survey research "comprises a cross-sectional design in relation to which data are collected predominantly by questionnaire or by structured interview on more than one case and at a single point in time in order to collect a body of quantitative or qualitative data in connection with two or more variables, which are then examined to detect patterns of association".

The rationale behind choosing the questionnaire survey in this research is fourfold:

- To be consistent with the adopted research paradigm (i.e. positivistic paradigm) and to achieve the research objectives in terms of generalisation, recognising relationships between research variables, and conducting the appropriate test analysis techniques such as simple and multiple regression.

- To achieve the research objectives, the targeted sample was the entire population which is located in different geographical locations; it was decided to adopt the questionnaire survey.

- Questionnaire survey is a popular as well as common method for collecting primary data among management and business research (Collis and Hussey, 2009, Creswell, 2009, Saunders et al., 2009, Sekaran and Bougie, 2010).

- This method has been extensively utilised in previous research in similar areas of MCS, MAS and strategy (e.g. Govindarajan, 1988, Mia and Chenhall, 1994, Chenhall and Langfield-Smith, 1998c, Bouwens and Abernethy, 2000, Bisbe and Otley, 2004, Abdel-Kader and Luther, 2008, Teerooven and Bhagtaraj, 2008).

4.7 Research Type

There are a number of different research design types; however no simple classification of research designs define and consider comprehensively all variations (Cooper and Schindler, 2008).

Collis and Hussey (2009) indicate that research could be classified according to the purpose of the research. They describe it as being exploratory, descriptive, analytical / explanatory or predictive research. Exploratory research is conducted when there are few or no earlier research studies that the researcher could refer for information regarding the research problem. The main aim is to seek for patterns, ideas or hypotheses, rather than testing or conforming hypotheses. Descriptive research is conducted to describe a particular problem or issue as it exist by identifying and obtaining information on its characteristics. Thus, quantitative data are more likely to be appropriate for descriptive studies (Sekaran and Bougie, 2010). Analytical or explanatory research is characterised as the developed stage of the descriptive research. The researchers go beyond the description of characteristics, to analyse as well as explain why or how the phenomena are happening. It aims to discover and measure causal associations among phenomena in order to understand them. Finally, predictive research takes the explanatory research a step further by forecasting the likelihood of similarities in situation occurs somewhere else. It aims to generalise

from the analysis by predicting certain phenomena on the basis of hypothesised, general relationships. This research type provides answers to how, why and where questions to current events as well as similar ones in the future (Collis and Hussey, 2009).

Based on the research's aim and objectives, the present study can be classified as descriptive and explanatory. Specifically, objectives' one, two and three, which identify the types of MCS, strategy formulation process, and the characteristics as well as the role of MAI in this process, can be classified as descriptive and analytical. Objective four, which seeks to examine the relationship between contingent variables and the usefulness of MAI in relation to MCS effectiveness, can be classified as analytical or explanatory part.

Many authors (e.g. Cooper and Schindler, 2008, Collis and Hussey, 2009, Saunders et al., 2009, Sekaran and Bougie, 2010) recognise two different types of research in terms of time horizons, including cross-sectional and longitudinal studies. With the former type, studies collect data once and provide a snapshot of the research phenomena at a point in time. On the other hand, longitudinal studies are carried out across a period of time and the data are collected at two different points in time. Accordingly, this research study can be classified as cross-sectional as the required data are gathered at a point in time.

In addition, Sekaran and Bougie (2010) stated that studies can be classified into causal or correlational in terms of type of investigation. Causal study is conducted when the researcher attempts to delineate one or more variables causing the problem. In other words, it deals with cause-and-effect relationships. Correlational research is concerned with identifying the important variables associated with the problem. According to the research objectives, this research study can be classified as correlational and causal investigation.

4.8 Data Collection Methods

As mentioned earlier in this chapter, the positivistic paradigm was chosen for the purpose of this research study, and thus the questionnaire survey method is chosen as the main vehicle of data collection.

Research data can be obtained from primary or secondary sources. The former are collected from original sources including experiments, questionnaire survey, interviews or focus groups, whereas the latter are gathered from existing sources, including publications, databases and internal records. In addition, survey methodology is linked to the positivistic paradigm and designed to collect primary or secondary data from a sample to statistically analyse it and generalise the findings to a population. Moreover, several methods can be adopted for collecting survey data in a positivistic research, including questionnaires and interviews (Collis and Hussey, 2009).

A questionnaire is defined as a set of questions, which are cautiously designed and tested to elicit reliable responses from a particular group of participants (Collis and Hussey, 2009, Sekaran and Bougie, 2010). It could be found in different types in terms of how it is distributed, including post/mail questionnaire, telephone questionnaire, on line questionnaire, and self-administered questionnaire. However, each type has its strengths and weaknesses (see for e.g. Oppenheim, 1992, Collis and Hussey, 2009, Sekaran and Bougie, 2010). Given the nature of the research population, namely large manufacturing companies operating in Libya, the self-administered questionnaire was considered appropriate to attain the research objectives. In the self-administered questionnaire, the researcher or a member of the research team presents the questionnaire to the participants, and explains the purpose of the investigation, and then the respondents are left alone to fill in and complete the questionnaire (Oppenheim, 1992, Sekaran and Bougie, 2010).

The main advantage of a self-administered questionnaire is that the completed response can be collected within a short period, clarify any questions on the spot if there are sensitive or complex ones that need to be asked, may ensure a high response rate, often save time and cost, and minimise researcher bias (Oppenheim, 1992,

Bryman and Bell, 2007, Collis and Hussey, 2009, Sekaran and Bougie, 2010). Furthermore, it offers a great opportunity for the researcher to introduce the research topic and motivate the participants to complete the questionnaire and answer the questions honestly (Sekaran and Bougie, 2010).

In addition to the preceding general advantages of a self-administered questionnaire, this type was chosen because of the following reasons:

- The postal service in Libya is not very reliable, which may increase the risk of low response rate and consumes time, making it unadvisable to rely on this service.

- Difficulties in finding updated, or even correct, contact details (e.g. email, telephone number) for the target respondents in the manufacturing companies in Libya, make it not possible to consider using email or telephone questionnaires.

- The research questionnaire is designed to collect comprehensive data and, consequently, it is quite long, therefore, if the questionnaire was administered by post, email or telephone it would have been neglected and a zero or very low response rate would have been obtained.

Collis and Hussey (2009) identify several important decisions that the researchers need to consider before designing and distributing their research instrument, including sample/population size, question design (i.e. type, wording, presentation), piloting the questionnaire, covering letter, distribution method, methods of data analysis and test of reliability and validity. These critical decisions are discussed next.

4.9 Research Population and Sample

The population of this research study is defined as all large manufacturing companies in Libya. The justifications for selecting these companies are as follows:

- Large companies are more likely to have clearly defined areas of responsibility and establish a well designed MCS in general and sophisticated MAS in particular and rely on both formal and informal systems compared to smaller size (Simons, 1990, Mia and Chenhall, 1994, Chenhall and Langfield-Smith, 1998c, Whitley, 1999, Hoque, 2004, Abdel-Kader and Luther, 2008).

- The research population is restricted to manufacturing companies only, as in the manufacturing sector companies tend to design/adopt their MAS/MCS differently from companies where operating in the service sector (Fisher, 1995, Drury, 2008). Therefore, it is difficult to either design a questionnaire that is appropriate for both manufacturing and non-manufacturing companies or to design two questionnaires, one for manufacturing and the other for non-manufacturing companies. In addition, similarities in features among manufacturing companies, compared to non-manufacturing ones, make it easier to design one questionnaire.

The sampling frame is a list of all cases in the study population from which the researchers will draw their sample. This list, however, in some occasions could be not available in complete and accurate conditions, and therefore the researchers have to develop their own sampling frame (Saunders et al., 2009). In the case of this study, the researcher has visited each of the Privatising and Investment Board, National Oil Corporation, Office of Audit and Oversight, all based in the capital Tripoli, and the Industrial Register Office, which is based in Misrata, to obtain a list or an index of the names and addresses of manufacturing companies in Libya. The researcher was able to get four different helpful lists. The list from the Privatising and Investment Board consists of 72 names of manufacturing companies; the Office of Audit and Oversight list consists of 240 names, all of which state-owned. This list, however, encompasses companies from different industries (manufacturing and non-manufacturing sectors) and only 42 of them were considered suitable for this study. Unfortunately, this list was incomplete as some of the state-owned companies were not included and

liquidated as well as in administration companies were included. The National Oil Corporation list contained 12 names with only 3 manufacturing companies (9 were either drilling or service companies). Finally, unclear long list was provided by the Industrial Register Office; it included more than 500 large, medium and small private companies. This list was not reliable as it did not contain contact details such as address, telephone number or email address, and the only available information was companies' location.

After carefully considering the repeated names in the lists, the initial sampling frame was prepared, which included 64 companies located in four different geographical parts of the country. However, during the period of distribution of the questionnaire, four state-owned companies were excluded from the frame, as they were partially or not operating at that time. Therefore, the final sampling frame consists of a total 60 companies as shown in Table 4.4.

Table 4.4 Population and Sampling Frame

Source	Total number	Companies suitable for the study	Final useable sample
Privatising and Investment Board	72	11	11
Office of Audit and Oversight database of state-owned companies	240	42	38
National Oil Corporation	12	3	3
Industrial Register Office data base of private business	More than 500	8	8
Total	-	**64**	**60**

Sekaran and Bougie (2010, p. 263) define a sample as a subset of the population. They further summarise the factors affecting decisions on sample size which include the size of the population itself. This would mean that the researcher, in some cases, has to use 100% sample (i.e. a census sample) when the population is relatively small to avoid bias and representation issues. Given the low number of large manufacturing companies operating in Libya, the research target sample is therefore the entire population.

The senior managers, such as the chief of management board, member of management board, chief executive officer, finance director, management accountant, were the target respondents for this research. The reason for choosing these respondents is that they are in a managerial position and should be knowledgeable enough to complete the questionnaire and provide accurate information as well as they are at the front line in relation to MAS/MCS design and use and strategy formulation process.

4.10 Questionnaire Construction and Pre-testing

Many authors (e.g. Saunders et al., 2009, Sekaran and Bougie, 2010) argue that the questionnaire is one of the most widely used techniques to collect data within studies that adopt a survey strategy. They state that, in order to be able to produce a good questionnaire, the researcher needs to ensure that it is designed to collect the precise data required to answer the research questions and meet the research objectives. Unlike other data collection methods, the researcher has one opportunity to collect data, so he/she will not be able to go back to the respondents and collect additional information using another questionnaire. It is difficult and time consuming to do the same job again.

Collis and Hussey (2009) indicated that when the research follows a positivistic paradigm, the researcher should identify and clarify any concepts he/she uses and how they can be conceptualised. Therefore, for the purpose of this study, a theoretical framework was built on the basis of meeting the research objectives, and linked to the questions of the survey questionnaire.

The questionnaire design influences the response rate and the validity and reliability of the data being collected. This positive effect could be enhanced by: careful design of every question, good layout of the questionnaire, clear explanation of the questionnaire purpose, pre-testing, and carefully planned and implemented administration (Saunders et al., 2009). The following subsections provide more detailed description of these elements.

4.10.1 Question Design, Wording and Layout

In order to reach an acceptable final version of this research questionnaire, significant effort and time were dedicated towards the construction and piloting of the questionnaire drafts as well as a detailed and careful evaluation were executed to each part of the questionnaire. In addition, the recommended procedures by many authors (e.g. Dillman, 1978, Oppenheim, 1992, Bryman and Bell, 2007, Collis and Hussey, 2009, Saunders et al., 2009, Sekaran and Bougie, 2010) were adopted to guide the construction process. The following are examples of different procedures adopted in this research in terms of general rules, wording choice, and layout:

- The purpose of the questionnaire was explained to all respondents, and a brief description (i.e. glossary) to some specific terms was provided.
- Leading, double negative, ambiguous, loaded, double-barrelled, offensive or embarrassing questions were avoided.
- Meaningful, simple, clear and direct language was used to make the questionnaire understandable to all participants.
- The questions length was kept as short as possible without distorting their content and meaning.
- Consistency in style and clear instructions to answer each question in every section were considered.
- Similar questions in content were grouped in the same section; for example, general personal information questions were presented under Section A, while questions related to MCS design and effectiveness were grouped under Section E, and questions associated to the characteristics of MAI in Section F.
- The question sequence led the respondents from general to more specific questions and from relatively easy to more difficult questions when answering the questionnaire.
- An attractive and neat appearance of the questionnaire: the final draft consists of eleven A4 pages, double-side printed and stapled to form a booklet that requires less paper and makes it appear shorter and more professional.

4.10.2 Question Types and Formats

Two types of question are commonly used for constructing the questionnaire, the open-ended and closed types. The former type is one in which the respondents are allowed to answer in their own words, while the latter type is one in which alternative answers are offered to the respondents to make the choice (Oppenheim, 1992, Collis and Hussey, 2009). The choice of open-ended or closed questions is determined by several factors. According to van der Velde et al (2004) this could be through the nature of the research's aim. In the case of exploratory research, the researcher utilises open questions in order to gather as much information as possible. On the other hand, with explanatory or analytical research, the researcher usually uses closed questions. Collis and Hussey (2009) argue that the type of questions used in a research is influenced by the research paradigm, therefore with the positivistic approach, the closed questions are commonly used, whereas in the interpretivism, the open-ended question are suggested.

In addition, the choice of question type could be determined by type of respondent and their motivation to participate, question content, and method of administration (de Vaus, 2001). Furthermore, in a long and comprehensive questionnaire it is recommended to use close-ended question types as they can be quicker and easier to answer and code (de Vaus, 2002).

Given the comprehensive nature and length of this research questionnaire, to be in accordance with the research type, and paradigm, the closed-ended type was used as the main type in constructing the questionnaire. In addition, a few open questions in the form of "*other (please specify)*" were used in Questions A1, A3, B1, C2, and D5 as well as at the end of the questionnaire to give respondents the opportunity to express their views on specific questions or to add additional insights or comments. Mangione's (1995) recommended to utilise open questions where short and specific answers are required or the possible answers are so large and it is impractically to be listed and put a check box response for each one.

To meet the research objectives, four types of closed question were used in the questionnaire, including category questions, list questions, quantity questions, and

rating questions. According to Saunders et al. (2009) category questions are designed in a way that the respondent's answer can fit one category only. These questions are helpful in collecting data about behaviour or attributes. This type was used in Questions A2, B2, B3, and E3. The second type of questions used is the list questions. A list question offers the respondents a list of responses so they can choose from. This type was used in Questions A1, A3, B1, D4, and D5. The third type is the quantity questions. A quantity question is in which the respondent gives a number to answer the question. They tend to be useful for collecting behaviour or attribute data. This type was used in Questions B3 and C1.

Finally, the main type of closed questions used in this questionnaire was rating questions in the form of a Likert-scale. They are often used to collect opinion data, and frequently utilised in questionnaires as they are easier and quicker to answer, no much space and writing required, and offer more options for statistical tests (Oppenheim, 1992, Mangione, 1995, Collis and Hussey, 2009).

There are many variants of the Likert-scale with the four-, five-, six- or seven-point rating scales as the most commonly used (Saunders et al., 2009). It has been suggested that different scales could be suited for different purposes. Under time pressure circumstances, it is advisable to use five-point scale as this being perceived by the respondents as relatively quicker and easier to use (Preston and Colman, 2000). In addition, Elmore and Beggs (1975) indicate that the quality of five-point scale as good as any, and the reliability rating is not effected by an increase in the rating scale from five to seven or even to nine points (quoted in Sekaran and Bougie, 2010, p. 151). Hence, this type of question was used throughout the questionnaire to measure some of the main research variables in Questions C2-C5, D1, D2, D3, D6, E1, E2, E4, E5, and F1-F4.

4.10.3 Questionnaire Pre-testing

Although a considerable effort was made to build the questionnaire in stages and detailed revisions were made to produce the final draft, it was nevertheless essential to pilot the final draft to establish whether further enhancement was needed before distributing it. Pre-testing the questionnaire using a small number of respondents prior to administration is always recommended. This ensures that the respondents will not have difficulties in answering questions and there are no problems with the wording as well as measurement (Sekaran and Bougie, 2010). In addition, piloting the questionnaire enables the researcher to obtain initial assessment of the content validity and the likely reliability of the collected data (Saunders et al., 2009). In this context, pre-testing the questionnaire could involve friends, colleagues, an expert or group of experts, and people who resemble, as possible, to the research sample to identify different views, insights, and ideas (Oppenheim, 1992, de Vaus, 2002, Saunders et al., 2009). Therefore, the final draft of the questionnaire is reached through number of pre-testing stages. These are discussed next.

The first stage of pretesting started with handing the finalised draft to seven Ph.D. students, who are undertaking their doctoral projects in various subjects related to business at the University of Huddersfield Business School and two other universities in the UK. Their feedback resulted in some useful suggestions, including wording of questions, clarity, presentation, and layout of the questionnaire.

The second stage of pretesting was conducted with two academic staff who hold Ph.Ds in accountancy from British universities and have an interest in management accounting. Both of these academics work as lecturers in the accountancy department at the Academy of Graduate Studies-Misrata branch- in Libya. Helpful comments in terms of design, wording, and contents were obtained and considered in re-drafting the questionnaire.

The third stage of pretesting involved a meeting with a chief of management board of the largest manufacturing company in Libya. The aim of this meeting is to obtain feedback, from a person similar to the research targeted respondents, on unclear instructions, wording, ambiguous questions, time required to complete the

questionnaire, and to assess the ability of respondents to answer the different aspects in the questionnaire.

The fourth stage of pre-testing involved distributing the questionnaire to five companies from the targeted population in the western region and collected all of them within seven days. The aim was to ensure that there are no problems in the questionnaire before the full distribution. After considering all the suggestions described above, a few modifications were made to produce a revised final draft.

4.10.4 Questionnaire Translation

The final version of the questionnaire (see Appendix A) was translated from English to Arabic (see Appendix B) as the latter is the official language used in the Libyan companies. The translated questionnaire was tested for accuracy and clarity of content through independent evaluation by bilingual speakers (e.g. other doctoral students at this University). Both final English and Arabic versions were sent to two academics working at Misrata University in Libya. Both of these academics hold Ph.Ds in accountancy from British universities and have an interest in management accounting. The two versions of the questionnaire were also sent to an expert translator at the same Libyan university to check and evaluate the content of the translated questionnaire against the original English version. A final check of grammar and spelling of the Arabic version was performed by an Arabic language expert prior to the printing and distribution of the questionnaire to the target companies in Libya.

4.11 Content and Sources of the Final Version of the Questionnaire

The final version of the questionnaire consists of 11 A4 pages, including the covering letter page, and the last page was left blank for the respondents to add extra comments. The questionnaire is divided into six sections. Details of each section are described next. The relationship of the questionnaire items to the research objectives and questions is summarised in Table 4.5.

Table 4.5 Link between Research Questionnaire Items, Objectives, and Questions

Questionnaire section	QN	NI	Scale and type	Purpose and usage	RO	RQ
A: General information about the responses	A1	1	Multiple choice	It is customary practice in most questionnaire surveys	-	-
	A2	2				
	A3	1				
B: General information about the companies	B1	1				
	B2	1				
	B3	1				
C: Strategy formulation: Choices and process	C1	1	Quantity	Strategy formulation length of time	1	1
	C2	3	1-5 Likert	Involvement in strategy formulation	1	1
	C3	10	1-5 Likert	Measurement of strategy formulation process, used for hypothesis H1	1	1
	C4	13	1-5 Likert	All items Measure competitive strategy, used for hypotheses H5, H11, and H16. First 4 items measure cost leader- ship priorities (H1, H2, H4 and H6), following 9 items measures product differentiation priorities (H1, H3, H4 and H6)	1 2 3 4	1 4 5 6
	C5	2	1-5 Likert	Measurement of the role of MAI in cost leadership and product differentiation priorities, used for hypotheses H2-H3	1	2 3
D: Organisational, environmental and managerial characteristics	D1	8	1-5 Likert	Measurement of centralisation, used for hypotheses H7 and H12	4	6
	D2	5	1-5 Likert	Measurement of formalisation, used for hypotheses H8 and H13	4	6
	D3	9	1-5 Likert	Measurement of environmental uncertainty, used for hypotheses H9 and H14	4	6
	D4	1	Multiple choice	Description of production process	-	-
	D5	1	Multiple choice	Description of production method	-	-
	D6	5	1-5 Likert	Measurement of manufacturing process complexity, used for hypotheses H10 and H15	4	6
E: MCS design and effectiveness	E1	7	1-5 Likert	All items measure the determinants of a successful design of MCS, 3 items measure the MCS effectiveness, used for hypotheses H7-H16	3 4	5 6
	E2	15	1-5 Likert	Measurement of more/less MCS bureaucratic, used for hypotheses H5 and H6	3	5

	E3	1	Multiple choice	MCS effectiveness internal indicators	3	5
	E4	12	1-5 Likert	Organisational success indicators	3	5
	E5	3	1-5 Likert	MCS effectiveness external indicators	3	5
F: Management accounting information	F*	20 × 2	(2) 1-5 Likert	All 20 items measure MAI usefulness**, used for hypotheses H4, and H12-H16 F1: 6 items measure scope dimension F2: 4 items measure timeliness dimension F3: 6 items measure aggregation dimension F4: 4 items measure integration dimension	2 4	4 6

QN: Question number; NI: Number of items; RO: Research objective; RQ: research question;
H: Hypothesis; *section F measures importance and availability of MAI;
**usefulness = scale of importance × scale of availability of each item and company.

- **Section A: Respondents General Information**

This section was designed to collect information about respondents, such as job title and position, experience, both in the current job and with the current company, and the highest qualification obtained.

- **Section B: Companies general information**

This section collects general information about companies, such as main industrial sector, companies' age in the current sector, and type of ownership.

- **Section C: Strategy Formulation**

This section was sought to gather information about the choices and process of strategy formulation in the sampled companies. It was split into five questions.

Question C1 was aimed at collecting information about the approximate length of time for which the corporate, competitive and tactical level strategies are formulated.

Question C2 was designed to identify the degree of involvement of certain people/groups in the strategy formulation process at the three levels of strategies, on a five-point scale rating from 1 (never) to 5 (always).

Question C3 was sought to describe the strategy formulation process, by asking the respondents to indicate to what extent the provided statements describe strategy formulation in their companies, on a five-point scale rating from 1 (not at all) to 5 (to a considerable extent). This instrument was developed based on the literature review, using books (e.g. Hofer and Schendel, 1978, Porter, 1980, Ulwick, 1999, Johnson et al., 2006), and some items adopted from previous studies such as Miller and Friesen (1978), Grant (1991), and Platts et al. (1998).

Question C4 was designed to measure the company's competitive strategy, by asking the respondents to indicate the degree of emphasis on 13 items in relation to their company's strategic priorities, on a five point scale rating from 1 (not emphasised) to 5 (considerably emphasised). The first 4 items are concerned with cost leadership priorities and the next 9 items are focused on product differentiation priorities. This instrument was adopted from Auzair and Langfield-Smith (2005), which based on Chenhall and Langfield-Smith (1998c) instrument and widely used in the MAS/MCS-strategy literature (e.g. Jermias and Gani, 2004, Hyvönen, 2007, Amoako-Gyampah and Acquaah, 2008).

Question C5 asked the respondents, on a five point scale rating from 1 (not important) to 5 (considerably important), to indicate the role of MAI in strategic priorities in their companies.

- **Section D: Organisational, Environmental and Managerial Characteristics**

This section is aimed at collecting information on the organisational structure, environmental uncertainty, and manufacturing technology. It encompasses the following six questions.

Question D1 was designed to measure the degree of centralisation in decision management, which based on the instruments developed by Hage and Aiken (1967), Pugh et al. (1968), and Gordon and Narayanan (1984) and commonly used in the previous studies (e.g. Dewar et al., 1980, Merchant, 1981, Chenhall and Morris, 1986, Teerooven and Bhagtaraj, 2008). The respondents were asked to indicate, on a five point scale rating from 1 (never delegated) to 5 (always delegated), the extent to

which decisions are delegated to middle/operational managers by top management in their companies.

Question D2 was, adopted and adapted from Hage and Aiken (1967) and, sought to measure the degree of formalisation by asking the respondents to indicate to what extent the given statements about rules, routines and job descriptions guide managers in their companies, on a five point scale rating from 1 (not at all) to 5 (to a considerable extent). This instrument was used in previous research such as Dewar et al.(1980), and Nicolaou (2000).

Question D3 was designed to ascertain the environmental uncertainty by asking respondents indicate the predictability of a number of aspects by managers in their companies, on a five point scale rating from 1 (not at all) to 5 (to a considerable extent). This instrument was developed by Govindarajan (1984), which is based on the instrument developed by Miles and Snow (1978), and commonly adopted in previous studies (e.g. Chenhall and Morris, 1986, Mia, 1993, Gul and Chia, 1994, Fisher, 1996, Agbejule and Burrowes, 2007).

Question D4 was designed to indicate the company's production process; this question was developed by Woodward (1965), and also used by Hull and Collins (1987).

Question D5 was aimed at identifying which production methods were used in the sampled companies; this question was adopted from Bruggeman and Slagmulder (1995), and Leftesi (2008).

Question D6 was designed to measure the level of manufacturing process complexity by asking the respondents, on a five point scale rating from 1 (not at all) to 5 (to a considerable extent), to indicate the product diversity in their companies. This question was adapted from Krumwiede (1998) and recently used in the management accounting literature (e.g. Al-Hussari, 2006, Abdel-Kader and Luther, 2008).

- **Section E: MCS Design and Effectiveness**

This section was aimed at collecting information about the determinants of a successful MCS design, types of MCS, and organisational success and the effectiveness of company's MCS.

Question E1 was developed based on the literature review, using books (e.g. Anthony and Govindarajan, 2007, Merchant and Van der Stede, 2007), and review studies (e.g. Chenhall, 2003, Langfield-Smith, 2007), to indicate, on a five point scale rating from 1 (not at all) to 5 (to a considerable extent), the determinants of a successful design of MCS in the responding companies.

Question E2 was designed to measure the types of MCS used in the sampled companies, by asking respondents to indicate, on a five point scale rating from 1 (never) to 5 (always), the extent to which the provided statements apply to their companies. This question was adapted from Auzair and Langfield-Smith (2005), and Kober et al. (2007). The items in this question, to measure each type of MCS, were developed based on relevant previous literature (e.g. Amigoni, 1978, Ouchi, 1979, Otley, 1994, Merchant, 1998, Whitley, 1999).

Question E3 was sought to identify the performance measures that these companies rely on to determine the effectiveness of their MCS.

Question E4 was designed to collect information about company's organisational success, by asking respondents to indicate, on a five point scale rating from 1 (not at all) to 5 (to a considerable extent), to what extent they use the given performance indicators for measuring their companies' organisational success. This question was adapted from Govindarajan (1984, 1988) and Govindarajan and Fisher (1990), and widely used in other research studies (e.g. Abernethy and Guthrie, 1994, Chenhall and Langfield-Smith, 1998c, Hoque, 2004).

Question E5 was developed to collect further information related to the company's MCS effectiveness by asking the respondents to indicate, on a five point scale rating from 1 (not at all) to 5 (to a considerable extent), to what extent their companies use external benchmarks to determine the effectiveness of MCS.

- **Section F: Characteristics of MAI**

  This section collects data about the importance and the availability of MAI characteristics. It consists of four questions to measure each dimension of the characteristics; scope, timeliness, aggregation, and integration. The questions used in this section were based on the instrument developed by Chenhall and Morris (1986) and Gordon and Narayanan (1984), and widely adopted as well as adapted by the majority of later studies interested in the MAI area (e.g. Mia, 1993, Gul and Chia, 1994, Chong, 1996, Mia and Clarke, 1999, Chang et al., 2003, Teerooven and Bhagtaraj, 2008). Unlike the previous sections in the questionnaire, questions with two-sided five point scales were utilised in this section; the scale related to the importance was located on the left side of the instrument rating from 1 (not important) to 5 (very important), while the scale related to the availability was on the right side of the instrument rating from 1 (not available) to 5 (always available). The scores on each item obtained from both scales were used to calculate and create a new variable, namely usefulness of MAI, which is used for further analysis (see Chapter Five).

  Questions F1, **F2**, **F3**, and **F4** were designed to measure scope, timeliness, aggregation, and integration respectively, by asking respondents to indicate, using the previous two scales, to what extent the given items are important / available for planning, control and problem solving activities in their companies.

  At the end of the questionnaire the respondents were encouraged to add any additional comments or suggestions related to the issues mentioned in the questionnaire using the last page, and a separate sheet if needed. Finally, they were appreciated and thanked for participating and completing the questionnaire and invited to provide contact details if they were able to be interviewed later.

4.12 Questionnaire Administration

In order to maximise the survey response rate, a number of procedures recommended by many authors (e.g. Dillman, 1978, Oppenheim, 1992, Saunders et al., 2009) have been followed.

These steps include, first, pre-testing the research questionnaire (see sub-section 4.10.3), second, distributing the questionnaire personally (see Section 4.7), and finally, covering letter accompanying the questionnaire (see Appendix A). According to Saunders et al.(2009) and de Vaus (2002), the covering letter should contain some features to be adequate. Hence, the following features were addressed by the covering letter in this case:

- The University of Huddersfield's official logo was displayed at the top of the letter.
- A brief description to the research title, aim and its importance to the target companies.
- Respondents were reassured that their responses would be treated as strictly confidential and used only for the purposes of the research study.
- Respondents were provided the researcher's contact details for any queries.

Finally, copies of three supporting letters were included with the questionnaire. The first letter was from Huddersfield University, UK, where this research project was developed. The second was from the Libyan Cultural Affairs bureau in London, the financial sponsors of my studies, and the third letter was from a powerful institution in Libya, the Privatising and Investment Board. These letters helped in encouraging all companies to participate in this research study.

Once the final draft of the questionnaire was produced, it was personally distributed on 2nd June 2010 to each target company. Given the geographical spread of the target companies, the administration of the questionnaire survey required extensive travelling, by car and once by air, to different parts of the country to distribute by hand and then collect the (completed) questionnaire from each of the 60 large companies. Each manufacturing company was delivered an envelope, consisting of a covering letter, the questionnaire, and the supporting letters. In many cases some time was spent with the respondents to introduce the research project and clarify any ambiguities, hoping that would motivate the respondents to give complete and honest answers. In some of these cases, this lasted until the respondent had finished completing the questionnaire. During the course of these unplanned discussions, eight

of the participants expressed a lot of interest in the research topic, discussed its relevance to their companies and requested a summary of the study findings.

Every effort was made to try and get the questionnaire completed and collected on the same day of the visit, particularly when the company was located far away. However, on average, respondents took between one to two weeks to hand back the completed questionnaire. In these cases, reminder phone calls were made to the participants to check if they had filled in the questionnaire and to give a date for when it could be collected. Every time a questionnaire was collected, it was immediately checked on the spot for completeness and usability of response. When necessary the respondent was asked to clarify their answers and answer any questions they had missed. This process, continued from early June until late August, resulted in collecting 54 usable questionnaires from the 60 that were distributed, thus yielding a 90% response rate (see Table 4.6 below).

Table 4.6 Questionnaire Response Rate Analysis

Population size (Large manufacturing companies)	64
Ineligible, company not operating [4]	-4
Refusals/company policy/staff busy	-2
Total questionnaire returned	58
Unusable questionnaire/ partially completed	-4
Total usable questionnaires	**54**

The response rate was calculated as follow:

$$\text{Response rate } (\%) = \frac{number\ of\ usable\ questionnaires}{number\ of\ population\ size\ -number\ of\ ineligible,company\ not\ operating}$$

$$\text{Response rate } (\%) = 54/(64-4) = \mathbf{90}\%$$

[4] Some of the targeted companies were not or partially operating, because of the re-evaluation procedures as the government is privatising them.

In most of the academic studies where top management or organisations' representatives' are involved, a response rate of approximately 35 per cent is considered acceptable. However, this percentage could vary according to cultural aspects (Baruch, 1999, Saunders et al., 2009). Therefore, the response rate obtained from this research is considered to be very reasonable.

4.13 Validity and Reliability

It is considerably important to assess the goodness of the measures developed to ensure that the developed instrument measures accurately the concept that set out to measure not something else (Sekaran and Bougie, 2010). In other words, measurement of research variables must be valid, that is, it should collect data representative of the true picture of what is being studied. It also must be reliable, that is, if the research repeated the same results would be obtained. Therefore, these two issues are vital in a positivistic research (Collis and Hussey, 2009).

4.13.1 Validity

Validity is concerned with whether the research findings are accurately represented to what is really happening in the addressed situation. In other words, it is a test of how well the developed instrument at measuring the intended concept (Collis and Hussey, 2009, Saunders et al., 2009, Sekaran and Bougie, 2010). There are two major forms of validity mentioned in the research literature, *external* and *internal* validity. External validity is concerned with generalising the research findings across persons, settings, and times (Cooper and Schindler, 2008). Accordingly, in order to attain external validity, the sample must be valid, that is, designed well to represent the characteristics of the population. This could be achieved through, first, accuracy of the sample, which refers to the degree to which bias is absent from it, and second, precision of the sample, which measures how closely the population is represented by the sample. A type of standard deviation measurement, namely standard error of estimate, is used to measure precision; the higher the standard error of estimate, the smaller is the precision of the sample. The ultimate sample design produces a small standard error of estimate (Cooper and Schindler, 2008).

As mentioned earlier in Section 4.9, the targeted sample of this research was the entire population as well as the high response rate obtained indicates that the sample represents the population, hence the external validity established. Also variables in this research model have a standard error of estimate of less than one. Therefore, it can be concluded from the above that it is possible to generalise the findings of this study to the entire population.

In addition, the non-response bias may influence the findings generalisation, and it is recommended to carry out non-response bias tests in order to generalise the survey's results. However, non-response bias is not problematic when the response rate is particularly high (Govindarajan, 1984, Govindarajan and Gupta, 1985, Chong, 1998, Jermias and Gani, 2004). Given the high response rate of this research (90%), no test for non-response bias was considered necessary.

On the other hand, the internal validity refers to the ability of the research instrument to measure what it is claimed to measure (Cooper and Schindler, 2008). In this context, three common types of validity tests are usually used to test the goodness of measures, including *content*, *criterion*, and *construct* validity. The content and construct validity were used to assess the research instrument. *Content validity* ensures that the instrument tapped the concept by covering an adequate and representative set of items. The more the scale items represent the field of measured concept, the greater the content validity (Sekaran and Bougie, 2010). The content validity determination involves judgment, and this could be achieved through, first, a well defined topic, scaled items, and used scales, which are different from one research to another, and second, the use of a panel of judges to assess the goodness of an instrument in meeting the standards (Cooper and Schindler, 2008, Sekaran and Bougie, 2010).

To achieve the content validity of the research instrument, an extensive review of the relevant literature was undertaken to defined the topic and clarify the items and scales used in the instrument. Most of the items and scales were adopted from related prior studies (see Section 4.11). Moreover, the questionnaire items were pre-tested in

several stages as indicated earlier (see Section 4.10.3). Therefore, the content validity of this research instrument was established.

Construct validity testifies to how well the findings obtained from the use of measure fit the theories around which the test is designed (Sekaran and Bougie, 2010, p. 160). It can be achieved through pre-testing procedures. This research study, as mentioned earlier, has carried out a number of pre-testing stages to ensure enhanced construct validity.

4.13.2 **Reliability**

The reliability of a measure indicates the extent to which it is free of error (without bias) and consequently ensuring measurement consistency over time and across the different items in the instrument (Sekaran and Bougie, 2010). Reliability refers to consistency; therefore it is concerned with the questionnaire robustness and whether or not it produces consistent results at different times and under different occasions. Thus, reliability is a matter of stability (Easterby-Smith et al., 2002, Saunders et al., 2009). Three different forms are commonly used to assess the reliability of instrument, including test re-test, internal consistency, and parallel (alternative) form. However, the most popular form of assessing reliability, for multipoint-scaled items, is internal consistency utilising the test of Cronbach coefficient alpha (Bryman and Bell, 2007, Saunders et al., 2009, Sekaran and Bougie, 2010). Therefore, Cronbach alpha was adopted to determine the overall reliability of the measurement scale for each construct of the study. The internal consistency is concerned with whether or not the items built in a scale tend to measure the same concept (Bryman and Bell, 2007). The higher the Cronbach alpha scores the more reliable measuring instrument. In this context, the recommended acceptable score of an alpha is not less than .60 (Hair et al., 2003). Table (4.7) below shows the Cronbach alpha results of all variables (questions) that were measured with scaled items (more than two) have passed the test and the obtained values exceeded the minimum value required to assess the reliability.

Table 4.7 Reliability Test Results

Variables	Question(s)	No. of items	Cronbach alpha
Strategy formulation	C3	10	.917
Strategic priorities (competitive strategy)	C4	13	.925
• Cost leadership priorities	C4a	4	.775
• Product differentiation priorities	C4b	9	.901
Centralisation	D1	8	.900
Formalisation	D2	5 (1 item excluded)	.793
Environmental uncertainty	D3	9	.903
Manufacturing process complexity	D6	5	.644
Determinants of successful MCS design	E1	7	.807
Types of MCS	E2	15	.902
Organisational success (performance)	E4	12	.881
External benchmarks	E5	3	.714
MCS effectiveness	E1 (a, b and g)	3	.753
Importance of MAI (all items)	F1-F4	20	.951
• Scope	F1	6	.863
• Timeliness and frequency of reporting	F2	4	.809
• Aggregation	F3	6	.900
• Integration	F4	4	.875
Availability of MAI (all items)	F1-F4	20	.955
• Scope	F1	6	.863
• Timeliness and frequency of reporting	F2	4	.867
• Aggregation	F3	6	.892
• Integration	F4	4	.875
Usefulness of MAI (all items)	F1-F4	20	.959
• Scope	F1	6	.863
• Timeliness and frequency of reporting	F2	4	.878
• Aggregation	F3	6	.912
• Integration	F4	4	.890

4.14 Methods Used in Data Analysis

There is a considerable debate related to which of the two main groups of inferential tests, parametric or non-parametric, is to utilise when analysing the data. The parametric tests require the data to be measured on interval or ratio scales (i.e. metric)

as well as to be normally distributed. In contrast, non-parametric ones usually deal with nominal data (i.e. non-metric). Consistent with previous management accounting studies, mostly parametric tests were used to analyse the data collected for this study. Therefore, as explained later in Chapter Six, all the assumptions of parametric test used in this study were met. However, one non-parametric test was applied to test hypotheses **H2** and **H3** due to the violation of the normality assumption to the variables being examined in these two hypotheses. In order to fulfil the objectives of the research, the following statistical techniques are used to analyse the data.

4.14.1 Descriptive Statistics

Descriptive statistics such as mean scores, frequencies and percentages were used to achieve research objectives one, two and three (see Section 4.2). The statistical means were calculated and used to rank the importance of each item within a set of items in relation to, for instance, strategy formulation process, MCS types as well as the organisation success indicators (see Chapter Five). Furthermore, frequencies, means, graphs, and percentage were used to describe characteristics of respondents and responding companies as well as to inspect the tests assumptions.

4.14.2 Test of Difference

One of the most commonly investigated questions in the business research is whether the means of two or more groups of respondents differ significantly on some behaviour or attitude (Hair et al., 2003). This difference in the mean scores could be tested when these scores are from related samples (i.e. repeated measures) or from independent samples (i.e. two different groups of participants). Given that research hypotheses **H1**, **H4**, and **H6** seek to examine the difference between cost leaders and differentiators in terms of strategy formulation process, usefulness of MAI, and the adoption of MCS types (see Chapter Six), the independent t-test (parametric) is used in the study to test these hypotheses.

4.14.3 Correlation and Regression

Correlation analysis is used to determine whether there is a relationship between two or more variables and the strength as well as the direction of this relationship (Pallant,

2007, Field, 2009). Although this test is useful in providing insight to the association between variables, it does not identify which variable causes the other. In addition, correlation analysis could be parametric (i.e. Pearson correlation) or non-parametric (i.e. Spearman rho correlation). The latter type was utilised in this research to test hypotheses **H2** and **H3** as the data of the variables related to these two hypotheses did not meet the criteria of Pearson's correlation.

In contrast, regression analysis takes the correlation analysis a step further and predicts one variable from another. In other words, it is used to identify the effect of independent variable(s) on the dependent variable. According to Hair et al.(2003) regression analysis is the most widely used data analysis technique to measure linear associations between at least two variables, and it could be in a simple form where a single independent variable is used to predict a single dependent variable, or could be multiple where the impact of at least two independent variables on the dependent variable. Multiple regression provide information related to how much of the variance in the dependent variable that could be explained by the independent variables when they are included in the model simultaneously

Both correlation and regression analysis are used in this research as the independent and dependent variables are measured with interval data (i.e. metric). Correlation analysis is applied to examine the role of MAI in relation to cost leadership and product differentiation priorities (**H2** and **H3**). On the other hand, simple regression is utilised to examine the potential influence of competitive strategy on the design/adoption of MCS types as well as to examine the possible influence of the investigated organisational variables on the effectiveness of MCS, as stated in the research hypotheses **H5**, and **H7**-**H11** (see Chapter Six, Sections 6.5 and 6.6). Multiple regression is used to provide further details regarding the simultaneous influence of the contingent variables included in this research on the dependent variable (i.e. MCS effectiveness).

In addition, mediation regression is used to test the mediating effect [5] of the usefulness of MAI on the association between contingent variables and MCS

[5] For the purpose of this research, mediation effect implies either full or partial mediation.

effectiveness (**H12**-**H16**). In order to proceed and examine this mediating effect (see Chapter Seven), Preacher and Hayes (2004) macro was used for estimating indirect effect in simple mediation. The macro was downloaded and integrated with the SPSS 18 package. Full description of this technique and the output interpretation is discussed later in Chapter Seven (see Section 7.2).

4.14.4 Factor Analysis

Factor analysis is a multivariate statistical technique which can be used to summarise the information from a large number of variables (e.g. test items, questionnaire response) into a much smaller number of variables or factors. The purpose of this technique could be achieved from two methods, including principal components analysis and common factor analysis (Hair et al., 2003).

The principal components analysis is concerned with the reduction of the original set of variables to a smaller set of composite variables, while the common factor analysis is utilised when the main purpose is to identify the underlying dimensions in the original variables (Hair et al., 2011).

Despite the amount of debate that has been going on which method is appropriate to use, empirical research often reported similar findings and solutions when applying both methods for the same problem. For the purpose of this research, the principal components analysis (hereafter referred as factor analysis) was chosen, as it is the most commonly used method in business research and because common factor analysis is difficult for non-statisticians to conceptualise (Hair et al., 2003, Field, 2009). Therefore, the principal components analysis was used to define the dimensions that are critical for MCS effectiveness (see Chapter Five).

4.15 Summary and Conclusion

To attain the research objectives the positivistic paradigm and the questionnaire survey method were adopted. Quantitative data were collected from all large manufacturing companies operating in Libya using questionnaire survey, yielding a high response rate. Validity and reliability were established using the appropriate tests and, finally, the types of statistical tests chosen for this research were presented and explained.

The next chapter presents the descriptive analysis of the results related to the first, second and third research objectives of the current study.

Chapter Five

Descriptive Analysis of Companies' Strategy, MCS and MAI Characteristics

5.1 Introduction

The chapter introduces the descriptive statistics based on general information related to the respondents, responding companies, and the characteristics of the adopted MCS as well as MAI. The descriptive statistics presented in this chapter are mainly related to the following three research objectives (see Chapter one):

- To examine the strategy formulation process in large manufacturing companies in Libya, and the role of MAI in this process.
- To identify the perceived usefulness of MAI in these companies.
- To identify the types of MCS, their relationship with competitive strategy and effectiveness in these companies.

This chapter is organised as follows: general information about respondents and the responding companies is provided in Sections 5.2 and 5.3. Next, the strategy formulation process and manufacturing characteristics are presented in Sections 5.4 and 5.5 respectively. This is followed by Section 5.6 which focuses on the types as well as the effectiveness of MCS used in the responding companies. The importance, availability, and usefulness of MAI are presented in Section 5.7. The chapter concludes with a summary in Section 5.8.

5.2 General Information about the Respondents

The first section of the questionnaire (Section A) was devoted to gathering general information regarding the respondents' job title, experience in their current job and with the current company, and details of their academic and professional qualifications.

Given the nature of the information required by this research, respondents who are experienced or know much about decision management process and MAS in their

companies (e.g. senior managers) were targeted to participate in answering the questionnaire. Therefore, no effort was spared to ensure that senior managers (e.g. Chief of Management Board, Chief Executive Officer) participated in the questionnaire survey.

As Table 5.1 shows, the vast majority of the respondents (81.5%) are in charge of top management responsibilities in their companies and most (68.5%) have been in their current job for more than 6 years or have worked for their companies for more than 6 years (74.1%). Academic degrees are the most prevalent type of qualification achieved by the respondents with 74.1% holding a bachelor's degree and 16.6% also have a post-graduate qualification.

Table 5.1 General Information about the Respondents

	Frequency	Percentage	Cumulative Percentage
Job title and position			
Chief of management board	8	14.8	14.8
Member of management board	7	13.0	27.8
Chief Executive Officer	6	11.1	38.9
Finance Director	23	42.6	81.5
Management Accountant	7	13.0	94.4
Other	3	5.6	100.0
Total	**54**	**100.0**	
Experience in the current job			
Less than one year	1	1.9	1.9
1-5 years	16	29.6	31.5
6-10 years	14	25.9	57.4
More than 10 years	23	42.6	100.0
Total	**54**	**100.0**	
Experience with the current company			
Less than one year	2	3.7	3.7
1-5 years	12	22.2	25.9
6-10 years	10	18.5	44.4
More than 10 years	30	55.6	100.0
Total	**54**	**100.0**	
Highest qualification			
Bachelor's degree	40	74.1	74.1
Post-graduate (e.g. MSc, MBA, Ph.D.)	9	16.6	90.7
Other	5	9.3	100.0
Total	**54**	**100.0**	

It may be concluded from the above information that the respondents are generally knowledgeable and also relatively highly experienced, in terms of how long they have

been working in the current job and company. Hence, the respondents are considered appropriate to provide relevant information regarding their MCS, strategy, and MAI.

5.3 General Information about the Responding Companies

In Section B of the questionnaire, respondents were asked to give information regarding the characteristics of their companies. Tables 5.2 and 5.3 as well as Figure 5.1 summarise these characteristics in terms of industrial sector, age of company and ownership type.

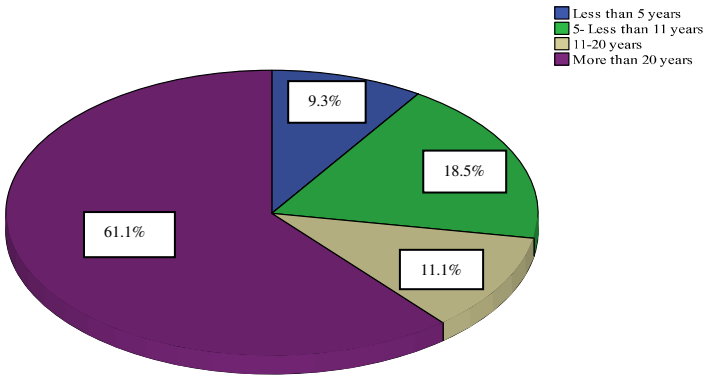
Table 5.2 Companies' Main Industrial Sector

Industrial sector	Frequency	Percentage
Food	21	38.9
Chemical	5	9.3
Engineering and electrical	2	3.7
Metal	5	9.3
Cement and building materials	11	20.4
Oil and gas	3	5.6
Other	7	13
Total	**54**	100.0

Although the participating companies represent a wide range of manufacturing sectors, nearly 60% are from food making sector and the cement and building materials sector.

The age distribution of companies is presented in Figure 5.1 below, showing that 90% of companies have been operating for over 5 years, while two thirds of them have been in business for more than 20 years.

Figure 5.1 Age Distribution of Companies



51.8% of the responding companies are state-owned, compared to 29.6% from the private sector. Although the Libyan government has taken few steps to move toward a free economy (Leftesi, 2008), the number of state-owned companies is still relatively high. It is also worth noting the presence of joint ventures among these large companies as their presences, regardless of how small for now, may prove vital for the development of effective MCS and MAS in the future.

Table 5.3 Companies Ownership

Ownership type	Frequency	Percentage
State-owned company	28	51.8
Private company	16	29.6
Joint venture (state and foreign partner)	5	9.3
Joint venture (state and private company)	3	5.6
Joint venture (private company and foreign partner)	2	3.7
Total	**54**	100

5.4 Strategy Formulation

This section aims to find out the time length for which the three strategies are formulated and the involvement of certain people or groups in the strategy formulation process. Question C1 asked respondents to indicate the approximate length of time for which the strategy is formulated.

As Table 5.4 shows the mean of corporate level strategy formulation time length was 3.57 years. It is worth adding that all responding companies from the food sector, the

engineering sector and 4 companies from the construction materials sector review their competitive strategies after one year. These sectors usually experience higher levels of competition in Libya compared to the rest of the sectors, hence the need to constantly adjust competitive position.

Table 5.4 Time Length of Strategy Formulation

Strategic level	Mean*	Minimum	Maximum
Corporate level	3.57	1	5
Competitive level	1.59	1	3
Operational level	1.00	1	1

* The mean is an average in years

Regarding the involvement in the strategy formulation process, respondents were asked to indicate the extent to which these people/groups are involved in each strategy formulation. As can be seen from Table 5.5 senior managers in the responding companies were the most people/groups involved (ranked 1) in the corporate, competitive, and operational strategy formulation process with mean score 4.83, 4.70, and 4.44 respectively. The General Assembly of the companies seems to be interested more in the corporate strategy formulation (4.00) compared to the middle managers as well as operational managers, who paid more attention to the operational level of strategy.

Table 5.5 Involvement in the Strategy Formulation Process

People / Groups	Corporate		Competitive		Operational	
	Rank	Mean*	Rank	Mean*	Rank	Mean*
The General Assembly of the company	2	4.00	3	3.02	4	2.63
Senior Managers (e.g. CEOs)	1	4.83	1	4.70	1	4.44
Middle Managers	3	3.43	2	3.91	2	4.09
Operational Managers	4	2.24	4	3.00	3	3.67
Other	5	1.13	5	1.15	5	1.19

*The mean is an average of scale of 1(never) to 5(always)

In order to collect information regarding the strategy formulation process, Question C3 asked respondents to indicate the extent of the given items describe their companies' strategy formulation process, on a five point scale (from 1 not at all to 5 to a considerable extent).

As it can be seen from Table 5.6, market orientation is the most critical aspect for strategy formulation process in the sampled companies. In other words, the starting point is understand, and thereby satisfy, customers' needs and preferences (ranked 1), as well as scanning the environment to attain and sustain a competitive advantage (ranked 2). This is followed by identifying and evaluating the relevant internal activities and actions in order to formulate achievable strategy.

Table 5.6 Strategy Formulation Process

Items	Rank	Mean
There is a strong understanding of customers' needs and preferences.	1	3.91
The strategy formulation process is based on attaining and sustaining the greatest competitive advantage for the company.	2	3.72
The new strategy is informed by the preceding strategy.	3	3.65
The company's resources and competences required to achieve the chosen strategy are well defined.	4	3.61
Activities that are involved in carrying out the desired strategy are clearly identified and attached with action plans.	5	3.54
The process of strategy formulation takes into account possible changes in business environment (e.g. exploit opportunities and/or meet threats in the environment).	6	3.48
The functions and actions are organised and work closely together to create superior value for customers.	7	3.46
During the strategy formulation process, strategy is divided into achievable sub-targets for each unit with clear performance criteria.	8	3.44
Adaptability/ flexibility of the company's strategy in the light of emerging opportunities/ threats.	9	3..19
The formulation is a formal systematic process and supported by strategic thinking methods (e.g. SWOT, VCA).	10	2.98
Overall mean		**3.50**

The above results are similar to the findings by Demirbag et al. (2010) study, who reported that Turkish firms, compared to their counterparts the British firms, do emphasise on several efficient procedures in the strategic decision making process, although they have placed more emphasis on managing environmental turbulence to improve their formulation process.

In general, the strategy formulation process in large manufacturing companies in Libya is a formal systematic process that initially built on crucial several activities; therefore it is not a coincidence process.

5.4.1 Competitive Strategy Classification

As mentioned in Chapter One, Porter's typology was adopted and adapted to capture the company's competitive strategy. Two main strategic priorities, including cost leadership and product differentiation, were considered separately to identify the degree of emphasis that the responding companies have placed on each priority. In this context, companies pursuing cost leadership strategy does not necessarily mean that they can totally omit quality features, or other differentiation characteristics. Similarly, companies following differentiation strategy cannot ignore some of the cost leaders features (Govindarajan, 1988, Langfield-Smith, 2007).

The above discussion was based on Porter's argument regarding the strategic priorities. He indicated that a strategy of cost leadership implies that "low cost relative to competitors becomes the theme running through the entire strategy, though quality, service, and other areas cannot be ignored" (1980, p. 35) and stressed that a strategy of differentiation "does not allow the firm to ignore costs, but rather they are not the primary strategic target" (1980, p. 37).

Three common methods have been used in the management accounting literature to capture competitive strategy, in general, and to classify companies into cost leaders or differentiators, in particular, when Porter's typology is adopted. The first method is to provide a brief description of each strategic priority and force the respondents to tick one statement that best describes the company's competitive strategy (e.g. Govindarajan, 1988, Govindarajan and Fisher, 1990, Abdel-Kader and Luther, 2008, King et al., 2010).

The second method is to provide several items under competitive strategy on a Likert scale question. In this case, the mean value of all items is considered as the base of determining the type of strategy being pursued. For example[6], if company's mean score of all items was higher than the scale's middle score, then it is classified as product differentiation, whereas if the mean score was below than the middle score, then it is classified as cost leaders ones (e.g. Baines and Langfield-Smith, 2003,

[6] This example is based on product differentiation dimension; however, alternatively the given items could be worded according to cost leadership strategy dimension.

Hoque, 2004, Jermias and Gani, 2004, Tsamenyi et al., 2011). The final method is to measure the two generic competitive advantages individually on the same construct. This could be achieved by providing two groups of items on the same Likert scale, whereby each group measures the degree of emphasis on each strategic priority and all items are set to capture the competitive strategy (e.g. Chenhall and Langfield-Smith, 1998c, Auzair and Langfield-Smith, 2005).

Although the three previous methods are valid and could be utilised to identify and understand the company's competitive strategy, it is believed that the third method is more suitable for this research. Unlike the first method where respondents are forced to choose one statement, the third one provides deep and comprehensive details in relation to each competitive strategic priority. These details are presented in a form of items on a Likert scale where the respondent can choose the degree that he or she believes best describe their companies real life. Also this is consistent with Porter's argument as companies focus on different activities but not necessarily all at the same degree. On the other hand, the second and third method both use Likert scale, but the latter take into account both strategic priorities, while the former consider one dimension. Therefore, the third method is utilised to distinguish between cost leaders and differentiators companies. Adopting this method requires turning a continuous variable into a categorical variable (i.e. dichotomize a continuous variable). This could be achieved through particular statistical techniques.

In this regard, Auzair and Langfield-Smith (2005) applied this method and used the *median split* technique to classify responding companies into product differentiation and cost leadership. However, the median split technique has not been recommended by statisticians (e.g. MacCallum et al., 2002, Field, 2009), as it destroys the data and significantly reduces the number of cases that could be used for the statistical analysis. For instance, Auzair and Langfield-Smith (2005) original sample consists of 121 usable questionnaires, and when they used the median split this led to consider only 41 questionnaires in order to test the related hypothesis (i.e. 25 cost leaders, 16 differentiators). In the case of this research, this procedure reduced the cases from 54 to 11 cases (i.e. 7 cost leaders, 4 differentiators) and, therefore, this technique was not

considered appropriate classifying companies into cost leaders and product differentiators.

Alternatively, the mean score of each group of items could be the criterion to classify the responding companies. In this context, the mean score of both cost leadership priorities items and product differentiation priorities items were calculated and compared for every company. The highest mean score of the two groups implies that the company is classified under that high score. To illustrate, if a company's mean score of cost leadership priorities is greater than the mean score of product differentiation priorities, the company is then classified as a cost leaders and versus versa. However, if these two mean values were equal, this might mean that there is no clear competitive strategy or the emphasis on both priorities is identical. Given the disadvantages of using the median split to dichotomies a continuous variable, the mean group technique is adopted in this research.

As competitive strategy was measured as two separate groups of items of cost leadership and product differentiation on the same scale, the sample consisted of companies that have first, high mean score on cost leadership priorities but low score on product differentiation priorities, second, high mean score on product differentiation priorities but low score on cost leadership priorities, and, finally, equal mean scores on both priorities.

As expected, after calculating and comparing these values, it was found that 37 of the responding companies have focused more on some activities that made them classified as cost leaders (i.e. mean score of cost leadership priorities is greater than the mean score of product differentiation priorities), while 15 of them have paid more attention to other activities that identified them as differentiators (i.e. mean score of cost leadership priorities is lower than the mean score of product differentiation priorities), and, as shown in Table 5.7, only two companies had an equal interest in both priorities (i.e. mean score on both priorities is 4.00).

Table 5.7 Strategic Priority Classification

Strategic priorities	Frequency	Percentage
Cost leaders	37	68.5
Product differentiation	15	27.8
Combination	2	3.7
Total	**54**	100.0

Data presented in Table 5.8 show that the mean score of all companies on cost leadership priorities (3.97) was slightly higher than their mean score on product differentiation priorities (3.69) implying that cost leadership activities have attracted these companies more than differentiation activities. One possible explanation is the attribute of the local market where most of the customers put product price on the top of the list, which forced these companies to compete on this important fact. On the other hand, data also show that cost leaders companies placed a great deal of emphasis on activities that concerned with achieving the lowest product cost in the market with a mean score of 4.46 (ranked 1), while product differentiators companies attached more emphasis on product quality improvement compared to other activities with a mean score of 4.47 (ranked 1). Although, these two groups of companies hold the same emphasis on activities related to improving the production system efficiency through better utilisation of existing resources as they both ranked them 3, the mean score of this item for each group was not equal. One of the most interesting findings here is that the overall mean score on cost leadership priorities for the cost leader companies is equal to the differentiator companies' overall mean score on product differentiation priorities (4.07 out of 5.00).

Table 5.8 Cost leaders and Differentiators Strategic Priorities

Strategic priorities activities	All sample (n = 54)		Cost Leaders (n = 37)		Differentiators (n = 15)	
	Rank	**Mean**	**Rank**	**Mean**	**Rank**	**Mean**
• ***Cost leadership priorities***						
Improving the efficiency of the production system by investing in new technology	6	3.78	5	3.86	8	3.53
Improving the efficiency of the production system through better utilisation of existing resources	4	4.09	3	4.11	3	4.07
Achieving lower product cost than competitors	2	4.30	1	4.46	5	3.87
Synchronising production and support activities	7	3.70	5	3.86	9	3.33
Mean of the group		**3.97**		**4.07**		**3.70**
• ***Product differentiation priorities***						
Customizing products to customer needs	3	4.13	4	4.00	2	4.40
Improving product design	5	3.93	6	3.70	2	4.40
Improving product quality by preventing production defects	1	4.33	2	4.30	1	4.47
Providing unique product features that are distinct from those of competitors	8	3.57	8	3.41	4	4.00
Offering a broader range of products than competitors	9	3.54	10	3.30	3	4.07
Launching new products in a timely manner	10	3.52	9	3.35	6	3.80
Broadening product availability and distribution	7	3.74	7	3.57	3	4.07
Making dependable delivery promises	11	3.43	11	3.27	7	3.73
Providing effective after-sales service and support	12	3.00	12	2.73	7	3.73
Mean of the group		**3.69**		**3.51**		**4.07**
Overall mean		**3.77**		**3.69**		**3.96**

In general, as can be gleaned from the above results, activities that relate to cost leadership priorities and others that relate to product differentiation priorities seem to be very important, but to varying degrees, for large manufacturing companies operating in Libya in order to attain and sustain a competitive position. These results imply that companies follow one strategic priority (i.e. cost leadership or product differentiation) cannot totally ignore the other, which is consistent with the argument raised up in the relevant literature (e.g. Porter, 1980, Govindarajan, 1988, Langfield-Smith, 2007).

5.4.2 The Role of MAI in Strategic Priorities

This sub-section aims to identify the role of MAI in cost leadership priorities and product differentiation priorities. Question C5 asked the respondents to indicate, on a five point scale (from 1 not important to 5 considerably important), the role that MAI plays in supporting cost leadership and product differentiation priorities.

As can be seen from Table 5.9, the mean scores of MAI role in cost leadership and product differentiation priorities were 4.30 and 4.13 respectively, and all companies have emphasised the important role that MAI plays in assisting different activities that related to both strategic priorities, as their responses were rated from slightly to considerably important.

Table 5.9 Role of MAI in Strategic Priorities

Strategic priorities	Mean	% rating 2	% rating 3	% rating 4, 5
Cost leadership	4.30	-	11.1	88.8
Product differentiation	4.13	1.9	16.7	81.4

The above results confirm the findings of previous research (e.g. Chenhall and Morris, 1995, Naranjo-Gil and Hartmann, 2006) in relation to the fundamental role of MAI in shaping and implementing the strategic activities regardless of the pursued competitive strategic priorities.

Although large manufacturing companies in Libya have considered MAI important to both strategic priorities, it seems that they have placed more importance to those information of cost leadership priorities (88.8%) than of product differentiation priorities (81.4%). One possible explanation of this result is the unpopularity of some MAPs (i.e. advanced practices), in the Libyan context, that could provide more relevant information to the activities of product differentiation priorities (e.g. Abulghasim, 2006, Alkizza, 2006, Leftesi, 2008).

5.5 Manufacturing Characteristics

In order to identify the companies' production process and production methods, the respondents were asked, in Question D4, to choose the answer that best describes

their production process and, in Question D5, to indicate the current production methods used in their companies. As Table 5.10 shows the production process of the majority of companies (57.4%) can be described as continuous flow and about half of this proportion (27.8%) as job shop process and to a lesser extent as passed assembly as well as batch flow.

Table 5.10 Companies Production Process

Process	Frequency	Percentage
Job shop	15	27.8
Paced assembly	4	7.4
Batch flow	4	7.4
Continuous flow	31	57.4
Total	**54**	100.0

On the other hand, Table 5.11 indicates that the most popular production method used among the sampled companies was the traditional, non-advanced system (70.4%) and more than 25% of them utilised TQM, while only one company adopted FMS.

Table 5.11 Companies Production Methods

Method	Frequency	Percentage
Traditional, non-advanced production system	38	70.4
Flexible manufacturing system (FMS)	1	1.9
Total quality management (TQM)	15	27.8
Total	**54**	100.0

Overall, large manufacturing companies in Libya are still in favour of the traditional system with relatively low adoption of advanced systems.

5.6 MCS Used in the Companies

In order to identify the types of MCS used and their effectiveness in large industrial companies in Libya, Questions E1 identifies the determinants of a successful MCS design, E2 identifies the ways of motivating, monitoring, controlling and directing activities, and E3 to E5 identify the performance indicators used for evaluating organisational success as well as MCS effectiveness in terms of financial and non-financial, and internal versus external indicators. The following three sub-sections discuss and summarise the findings related to these questions.

5.6.1 The Effectiveness of Company's MCS

Data presented in Table 5.12 show that all provided items in relation to the determinants of a successful MCS design have a mean score of above 3.00. The commitment of senior management and MAI are considered to be the most important determinants of the success of MCS with mean score 4.59 and 4.50 respectively, while, unexpectedly, the existence of MCS is to ensure successful implementation of strategy has a lower mean of 4.19 and ranked 5.

Table 5.12 Determinants of MCS Effectiveness

Items	Rank	Mean
The success of the MCS depends on senior management commitment	1	4.59
Management accounting information is vital for the MCS	2	4.50
The incentive schemes play a key role in the success of the MCS	3	4.43
The success of the MCS depends on the quality of its design*	4	4.36
The MCS exists mainly to ensure successful implementation of strategy	5	4.19
The MCS is designed to be adaptable to changing circumstances	6	3.72
The current MCS is sufficiently adequate for the company	7	3.63
Overall mean		**4.20**

*n=53

To sum up, the high mean scores of all items (4.20) indicates the importance of these items in determining the MCS effectiveness in large manufacturing companies in Libya.

As mentioned in Chapter four, factor analysis (i.e. principal components analysis) was used to find out whether the above items lead to a factor for identifying and understanding the dimensions of MCS effectiveness. The purpose of carrying out this procedure is to avoid biased response in relation to this variable (i.e. direct question may result in high unrepresentative scores). Therefore, the following recommended critical principles are taken into account (e.g. Hair et al., 1998, Hair et al., 2003, Tabachnick and Fidell, 2007, Field, 2009) in order to perform factor analysis:

- The Kaiser-Meyer-Olkin (KMO) statistics should be greater than .5 and the Bartlett's Test of Sphericity should be significant (Sig less than .05).
- Kaiser's criterion is used to select factors that have an eigenvalue value greater than one.

- The retained and considered factors should explain together at least 60% of the total variance.
- Only factor loadings with absolute values greater than .5 are considered important and will be displayed. These values indicate how relatively important each item in representing that factor. Therefore, the more the absolute value of items loading, the more easily to interpret and name the factor. The results of performing a factor analysis are presented next.

Table 5.13 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.727
Bartlett's Test of Sphericity	Approx. Chi-Square	127.092
	df	21
	Sig.	.000

As it can be seen from Table 5.13, the KMO value is .727, which exceeds the minimum requirement and therefore is considered as a good value (Field, 2009). In addition, the result of Bartlett's Test of Sphericity is significant at the level of .05 ($p < .001$). Hence, factor analysis is appropriate for the data of this research.

The results presented in Table 5.14 show the total variance explained by each component. As can be seen, two factors have values of Eigenvalues of greater than one, explaining 65% of that variance.

Table 5.14 Total Variance Explained by Each Factor

Component (factor)	**Initial Eigenvalues**		
	Total	**% of Variance**	**Cumulative %**
1	**3.320**	**47.426**	**47.426**
2	**1.245**	**17.787**	**65.213**
3	.716	10.234	75.447
4	.651	9.306	84.753
5	.467	6.672	91.425
6	.389	5.553	96.978
7	.212	3.022	100.000

In Table 5.15, items that loaded strongly of the first factor are listed first and ordered according to their size correlations with the factor, and the same was applied to the second factor.

Table 5.15 Rotated Component Matrix

Items	Component	
	1	2
The incentive schemes play a key role in the success of the MCS	.834	
The success of the MCS depends on senior management commitment	.751	
The MCS is designed to be adaptable to changing circumstances	.696	
The success of the MCS depends on the quality of its design	.656	
The current MCS is sufficiently adequate for the company		.914
The MCS exists mainly to ensure successful implementation of strategy		.879
Management accounting information is vital for the MCS		.515

From the above results it can be seen that the first factor comprises all items that relate to MCS design and implementation, such as the dependability on senior management commitment, its design quality and adaptability to circumstances change. Thus, this factor could be labelled as the determinant of a successful MCS. This factor is not of interest in this research; therefore it is excluded from further analysis.

The second factor consists of the items that related to MCS performance such as the sufficiency and adequacy of MCS and the main purpose of its existence. Consequently, this dimension is labelled as the effectiveness of MCS. As shown in the research's theoretical framework (Chapter one) and indicated in the research hypotheses (Chapter four), this factor is expected to be influenced directly by the investigated contingent variables (**H7**-**H11**), and indirectly through the usefulness of MAI (**H12**-**H16**). Therefore, the effectiveness of MCS is the dependent variable when testing these hypotheses.

5.6.2 Types of MCS

In Question E2, 15 items were utilised, regarding the types of MCS being used by the sampled companies. The respondents were asked to indicate to what extent the given statements apply to their companies, on a five point scale (from 1 never to 5 always). As suggested by Auzair and Langfield-Smith (2005) one end of the control continuum is more bureaucratic MCS type, including formal, tight, action, restricted, and impersonal controls, and the other end of continuum is less bureaucratic MCS, including informal, loose, results, flexible, and interpersonal controls. Specifically, a

company's MCS was recognised as more bureaucratic if the overall mean value is ≥ 3.00, and as less bureaucratic when the score is < 3.00.

As can be seen from Table 5.16, five control types were measured using different items. Formal/informal control: 7 items (c, f, h, k, m, n, and o), tight/loose control: 5 items (d, e, g, i, and j), action control: item (b), restricted control: item (a)[7], and impersonal control: item (l). Items' means were computed and ranked in the order of higher means value among the same group of items as well as among all items.

In respect to the formal control type, companies' MCS were considered formal when the overall mean score of the grouped items was ≥ 3.00. As the data show, all formal control items have a mean score of above 3.00, and the item "formal reports on the achievement of targets" has the highest mean score of 4.21 (ranked 1) within formal control items as well as among all Question E2 items. As a result, the overall mean value of formal control items was 3.65, which implies that the MCS of large manufacturing companies in Libya can be described as a formal control.

Within tight control items, the emphasis on analysing and investigating budget variance to ensure the efficiency as well as effectiveness of carrying out the operations has resulted in a high mean score of 3.87. Although, the item ranked 5 in the same group mean score was < 3.00, the overall mean value of tight control items was 3.51, which imply that the participated companies' MCS can be identified as tight control.

Action control and impersonal control, as mentioned earlier, were measured using one item each, and the means scores were 3.00 and 3.52 respectively. Therefore, the MCS of the sampled companies can be characterised as action as well as impersonal controls. However, restricted control type, was also measured with one item, mean score was 2.72. This implies that managers of these companies have to some extent the authority to take immediate actions in responding to new opportunities and challenges. In other words, the MCS adopted by these companies can be described as less restricted control.

[7] This item was worded in a positive direction, which basically measures flexible control, thus it was reversed before the total score was calculated to capture restricted control.

Table 5.16 Types of MCS

MCS type and items	Rank G*	Mean	Rank I**
• **Formal control**			
Formal reports on the achievement of targets (e.g. management reports, monthly performance reports)***	1	4.21	1
Formal communications (e.g. meetings, reports) in passing information up and down the hierarchy	2	3.98	2
Formal reports relating outputs with inputs consumed (e.g. costs per unit, output per labour hour)	3	3.78	4
Written rules, policies, procedures and targets are communicated formally to all employees, including managers	4	3.72	5
Managers are rewarded for the achievement of their targets by using financial incentives	5	3.39	9
Managers are rewarded for the achievement of their targets by using non-financial incentives	6	3.28	10
Formal appraisal of managers on a periodic basis	7	3.20	11
Mean of the group		**3.65**	
• **Tight control**			
Budget variance analysis and investigation to ensure the efficient and effective execution of operations	1	3.87	3
Written explanations for significant changes between current year results and the results of previous years	2	3.78	4
Managers' targets and the actions to achieve the targets are precise	3	3.61	6
Managers' actions and targets are frequently monitored	4	3.59	7
Evaluation of performance in any period by comparing results with those of competitors in the same industry	5	2.72	13
Mean of the group		**3.51**	
• **Action control**			
Managers' decisions and actions are monitored on an ongoing basis rather than focusing on the attainment of the desired targets	-	**3.00**	12
• **Restricted control**			
Managers have a high degree of discretion and autonomy in making decisions and responding to new opportunities or challenges	-	**2.72**	13
• **Impersonal control**			
Controls (regulations) are applied throughout the company uniformly and impersonally to avoid involvement with individual personalities and personal preferences of employees, including managers	-	**3.52**	8
Overall mean of MCS types		**3.49**	

* Rank among the group, ** Rank among all items, *** n=53

The above results are consistent with Leftesi's (2008) study findings, that the Libyan manufacturing companies were greatly relying on formal accounting control systems (e.g. budgeting systems), in motivating, controlling and directing activities. Moreover, the close link between organisational structure and MCS (Child, 1973, 2005) may provide additional support as well as possible explanation to the above results. Specifically, the descriptive statistics related to the two aspects of organisational structure investigated in this research (see Chapter Six, Table 6.1), indicate that the

sampled companies can be described as relatively low centralised (mean = 2.87), and high formalised organisations (mean = 3.78), and this has reflected the design and adoption of MCS types.

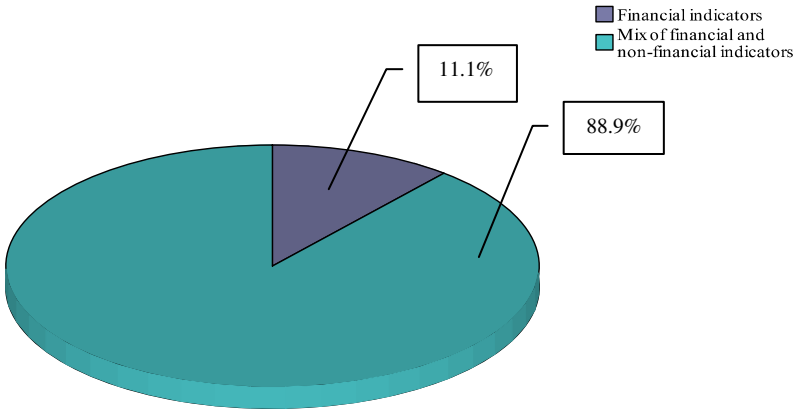
To conclude, large manufacturing companies in Libya tend to be in favour of more bureaucratic MCS as the overall mean score of all types was 3.49, and were derived mainly from formal, tight, as well as impersonal controls.

5.6.3 Organisational Success and MCS Effectiveness

To find out which performance indicators that the sampled companies use to assess the company's MCS, Question E3 asked respondents to indicate which performance measures their companies normally use to determine the effectiveness of company's MCS in terms of financial, non-financial, and mix of both indicators.

As Figure 5.2 shows the vast majority (88.9 %) of the responding companies rely on a combination of financial and non-financial indicators to determine the effect of their MCS, while only 11.1% of them use financial measures in this process. However, none of these companies have used non-financial indicators in isolation from financial ones when determining the effectiveness of company's MCS.

Figure 5.2 Performance Indicators for MCS Effectiveness



In order to collect more detailed information regarding the performance indicators that have been used in the sampled companies to evaluate organisational success, Question E4 asked respondents to indicate the extent of use of 12 financial and non-financial performance measures in their companies, on a five point scale from 1 not at all to 5 to a considerable extent. The data presented in Table 5.17 show that 10 indicators out of 12 have a mean score of above 3.00. Furthermore, the highly use of the indicators was derived from operating profits (ranked 1), profit to sales ratio (ranked 2), cash flow from operations (ranked 3), sales growth rate (ranked 4), and cost reduction programmes (ranked 5), all of which are financial performance measures. On the other hand, the less popular indicators were research and development activities (ranked 10) as well as contribution to social activities (ranked 11). Although, the majority of respondents (88.9%), as shown in Figure 5.2, indicated that their companies use a combination of financial and non-financial performance measures to determine the company's MCS effectiveness, the data obtained from Question E4 revealed that these companies have relied more on financial indicators.

Table 5.17 Organisational Success Indicators

Performance indicators	Rank	Mean
Operating profits	1	4.15
Profit to sales ratio	2	4.00
Cash flow from operations	3	3.96
Sales growth rate	4	3.85
Cost reduction programmes	5	3.74
Return-on-investment	6	3.63
New product development	7	3.55
Personnel development	8	3.42
Market share	9	3.35
Market development	9	3.35
Research and development activities	10	2.98
Contribution to social activities	11	2.74
Overall mean		**3.56**

The above results are in accordance with the earlier findings regarding the used types of MCS, as these companies utilised more financial indicators to evaluate their MCS. In addition to the internal performance indicators to assess the effectiveness of MCS and organisational success, external benchmarks could be used in this judgement. Thus, Question E5 asked respondents to indicate the extent of the use of external

benchmarks to evaluate company's MCS, on a five point scale (from 1 not at all to 5 to a considerable extent).

In this context, as table 5.18 shows, the utilisation of direct competitors and own industry averages indicators are relatively high, 83.3% and 81.5% respectively, compared to the indicator based on companies from other industries (55.6%). However, 51.8% of these companies utilise direct competitors to a significant and considerable extent when determining the company's MCS effectiveness, whereas 27.8% and 18.5% of them used to the same extent averages of own industry and companies from other industries respectively.

Table 5.18 Use of External Benchmarks

External indicator	Mean	% rating 1	% rating 2, 3	% rating 4, 5
Direct competitors	3.20	16.7	31.5	51.8
Averages for own industry	2.89	18.5	53.7	27.8
Companies from other industries	2.20	44.4	37.1	18.5

In general, comparisons with direct competitors is the popular indicator among others, in large manufacturing companies operating in Libya, to determine the effectiveness of company's MCS and organisational success with mean score 3.20 (ranked 1).

5.7 The Characteristics of MAI

To identify the importance as well as availability of the characteristics of MAI for planning, control and problem solving activities used in large manufacturing companies in Libya, the respondents were asked in Questions F1 to F4 to indicate for each dimension of MAI are important/available for the previous tasks (from 1 not important/not available to 5 very important/always available). Tables 5.19 and 5.20 present the mean score of each item, mean score of each dimension, overall mean score of importance/availability, rank of each item among group, and rank of each item among all items. The following two sub-sections provide further detailed information of these findings.

5.7.1 The Importance of MAI

As can be seen from Table 5.19, all items of scope dimension seem to be highly important as their mean scores were ranged between 3.98 and 4.37, with a mean group of 4.15. However, apart from the item "non-financial information that relates to production process", none of them was ranked, among all items, in the most five important items for planning, control and problem solving activities as shown.

Similarly, timeliness and frequency of reporting dimension was also considered to be important as the mean value of the group is 4.19, which was slightly higher than the mean score of scope characteristic. In addition, providing reports frequently on a systematic regular basis was the most important item among the group as well as among all items with a mean score of 4.44 (ranked 1).

On the other hand, aggregated MAI was recognised as the most important dimension for the activities of planning, control and problem solving in the sampled companies with a group mean score of 4.22. Specifically, each item in this group has a mean score of 4.00 or above. Therefore, three out of six items, which measure aggregation characteristic, were ranked in the most five important items (ranked 3, 4, and 5) among all items.

The importance of integrated MAI was relatively lower compared to the other three dimensions. Notwithstanding that the mean scores of the items individually were above 4.00, the overall mean score of the group was 4.12, and this was the lowest mean score amongst the four groups.

To conclude, large manufacturing companies in Libya attach considerable amount of importance to all MAI characteristics in relation to planning, control and problem solving activities with a mean score of 4.17; however the emphasis appears to be slightly more on the aggregated MAI than on the other three dimensions.

Table 5.19 Importance of MAI

Characteristics	Rank G*	Mean	Rank I**
• **Scope**			
Non-financial information that relates to production process (e.g. output rates, scrap levels, machine efficiency, employee productivity)	1	4.37	2
Quantification of the likelihood of future events occurring (e.g. probability estimates)***	2	4.19	7
Information that relates to possible future internal events (e.g. new capital projects)	3	4.17	8
Non-financial information that relates to product markets (e.g. market size, market growth)	4	4.13	9
Information that relates to possible future external events (e.g. customer preferences, attitudes of government and consumer bodies, competitive threats, manufacturing technology developments)	5	4.06	12
Information on broad factors external to your company (e.g. economic conditions, population growth)	6	3.98	14
Mean of the group		**4.15**	
• **Timeliness and frequency of reporting**			
Reports are provided frequently on a systematic, regular basis (e.g. daily, weekly reports)	1	4.44	1
Information that enables managers to monitor and control activities is available immediately upon request	2	4.26	6
Relevant information is supplied to managers automatically upon its receipt into information systems or as soon as processing is completed	3	4.17	8
There is no delay between an event occurring (e.g. competitors' actions, market demand) and relevant information being reported to managers	4	3.89	15
Mean of the group		**4.19**	
• **Aggregation**			
Information is provided on the different sections or functional areas in your company (e.g. marketing and production, or sales, cost, or profit centres)	1	4.35	3
Information on the effect of different sections' activities on summary reports (e.g. profit, cost, and revenue reports for other sections)	2	4.31	4
Information that has been processed to show the influence of events on different functions, such as marketing or production, associated with particular activities or tasks ***	3	4.28	5
Information on the effect of events on particular time periods (e.g. monthly/ quarterly /annual summaries, trends, comparisons)	4	4.26	6
Information provided in formats suitable for input into decision models (e.g. discounted cash flow analysis, incremental or marginal analysis, inventory analysis, credit policy analysis)	5	4.11	10
Information in formats which enable managers to conduct "what if" analysis	6	4.00	13
Mean of the group		**4.22**	
• **Integration**			
Information on precise targets for the activities of all sections within your company	1	4.26	6
Information that relates to the impact that your decisions would have on the performance of your whole company	2	4.13	9
Information on the influence of other individuals' decisions on your area of responsibility***	3	4.08	11
Information on the impact that your decisions will have on other sections in your company	4	4.06	12
Mean of the group		**4.12**	
Overall mean of the importance of MAI		**4.17**	

* Rank among the group, ** Rank among all items, *** n=53

5.7.2 The Availability of MAI

The data presented in Table 5.20 show that the availability of scope of MAI for planning, control and problem solving activities was reasonably available with a mean score of 3.12. However, the mean score of three items was less than 3.00, and all items were ranked between 8 and 17 in all items ranking, except for one item which has a mean score of 3.62 (ranked 5).

The above results imply that MAS in these companies provide relatively low broad scope information, as the more available information is financial in nature. This could be explained from the findings of previous studies conducted in Libya (e.g. Leftesi, 2008), as well as from earlier results of this research (see Sections 5.6.2 and 5.6.3), that is the sampled companies utilise more financial accounting information (i.e. traditional MAPs) for achieving and evaluating different tasks.

On the other hand, timeliness and frequency of reporting of MAI availability was slightly higher than scope dimension with a mean score of 3.35. As in the importance of timely MAI case, the item "providing information frequently on a systematic regular basis" was ranked (1) in the most five available information, in the same group as well as in other three dimensions, and scored the highest mean value of 3.81. However, the speed of reporting of relevant information to managers regarding the occurrence of events (e.g. competitors' actions) was relatively low with a mean value of 2.76.

The result regarding the emphasis on the systematic regular basis of the information provision, could be reflected by and linked to the greater reliance on formal procedures, rules, and routines that guided employees in these companies (i.e. formalisation, mean = 3.78).

In respect of the aggregation dimension, aggregated MAI was found the most available information for planning, control and problem solving activities with a mean score of 3.54, and this was the case, as mentioned in the preceding sub-section, for the importance of aggregate MAI. In addition, the mean values of each item in aggregation group were above 3.00.

As the previous results, related to aggregation dimension, show that aggregated information was perceived as the most important as well as most available information provided by MAS, the low degree of environmental uncertainty (see Chapter Six, Table 6.1) could be a possible explanations to these results. Specifically, when managers are faced with difficulties in predicting the environment they demand more detailed reports to deal with these situations, and vice versa. In addition, given the internal nature and purpose of the aggregated MAI, traditional MAPs are more likely to provide this information, and this seems to be consistent with subsections 5.6.2 and 5.6.3 results and early studies conducted in Libya (e.g. Leftesi, 2008).

Finally, integrated MAI was reasonably available with a mean score of 3.33, which slightly higher than timeliness dimension score, and the group items mean scores are above 3.00. These findings indicate the high organisational interdependence, coordination, and cooperation across departments/divisions within the sample companies.

In general, the availability of MAI in large manufacturing companies operating in Libya was acceptable to some extent with overall mean score of 3.33, and the availability of the four characteristics can be ordered as follows: aggregation, timeliness, integration, and scope.

Table 5.20 Availability of MAI

Characteristics	Rank G*	Mean	Rank I**
• **Scope**			
Non-financial information that relates to production process (e.g. output rates, scrap levels, machine efficiency, employee productivity)***	1	3.62	5
Information that relates to possible future internal events (e.g. new capital projects)	2	3.43	8
Quantification of the likelihood of future events occurring (e.g. probability estimates)	3	3.15	13
Information that relates to possible future external events (e.g. customer preferences, attitudes of government and consumer bodies, competitive threats, manufacturing technology developments)	4	2.93	14
Non-financial information that relates to product markets (e.g. market size, market growth)	5	2.91	15
Information on broad factors external to your company (e.g. economic conditions, population growth)	6	2.69	17
Mean of the group		**3.12**	
• **Timeliness and frequency of reporting**			
Reports are provided frequently on a systematic, regular basis (e.g. daily, weekly reports)	1	3.81	1
Relevant information is supplied to managers automatically upon its receipt into information systems or as soon as processing is completed	2	3.50	7
Information that enables managers to monitor and control activities is available immediately upon request	3	3.33	9
There is no delay between an event occurring (e.g. competitors' actions, market demand) and relevant information being reported to managers	4	2.76	16
Mean of the group		**3.35**	
• **Aggregation**			
Information is provided on the different sections or functional areas in your company (e.g. marketing and production, or sales, cost, or profit centres)	1	3.80	2
Information on the effect of different sections' activities on summary reports (e.g. profit, cost, and revenue reports for other sections)	2	3.76	3
Information on the effect of events on particular time periods (e.g. monthly/ quarterly /annual summaries, trends, comparisons)	3	3.59	6
Information that has been processed to show the influence of events on different functions, such as marketing or production, associated with particular activities or tasks	4	3.50	7
Information provided in formats suitable for input into decision models (e.g. discounted cash flow analysis, incremental or marginal analysis, inventory analysis, credit policy analysis)	5	3.43	8
Information in formats which enable managers to conduct "what if" analysis	6	3.17	12
Mean of the group		**3.54**	
• **Integration**			
Information on precise targets for the activities of all sections within your company	1	3.63	4
Information on the impact that your decisions will have on other sections in your company	2	3.31	10
Information that relates to the impact that your decisions would have on the performance of your whole company	3	3.20	11
Information on the influence of other individuals' decisions on your area of responsibility	4	3.15	13
Mean of the group		**3.33**	
Overall mean of the importance of MAI		**3.33**	

* Rank among the group, ** Rank among all items, *** n=53

5.7.3 The Usefulness of MAI

For the purpose of this research, a new variable was created to capture the possible effect (i.e. mediation) of MAI on the relationship between the investigated contingent variables and the effectiveness of MCS. This variable is named the *usefulness of MAI*. The mean of this new variable for each company is the mean score that results from multiplying each item's score on the *importance* scale with its counterpart score on the *availability* scale for the same item (i.e. importance × availability). In other words, it is not the product of the mean importance and the mean availability. This approach has been used in previous management accounting research (e.g. Ismail and King, 2007, Abdel-Kader and Luther, 2008), and the logic behind creating this new variable is that if information is important and available, certainly it would be perceived useful by managers for decision making and solving problems, whereas if it is important and not available or not important but available, it is considered not useful. In short, two preconditions needed to be met in order to benefit from MAI; that is importance and availability.

Since each item was measured using a five-point Likert scale, the individual result of the multiplications would range over all the possible scores from 1 to 25, and the value of this result is dependent on two initial values for each item (i.e. importance and availability). Table 5.21 shows the results that relate to the usefulness mean score for each item of the characteristics of MAI which are presented according to their rank among group and among all items.

Table 5.21 Usefulness of MAI

Information characteristics	Rank G*	Mean	Rank I**
• **Scope**			
Non-financial information that relates to production process (e.g. output rates, scrap levels, machine efficiency, employee productivity)***	1	16.34	4
Information that relates to possible future internal events (e.g. new capital projects)	2	14.89	9
Quantification of the likelihood of future events occurring (e.g. probability estimates)***	3	13.47	13
Non-financial information that relates to product markets (e.g. market size, market growth)	4	12.41	17
Information that relates to possible future external events (e.g. customer preferences, attitudes of government and consumer bodies, competitive threats, manufacturing technology developments)	5	12.39	18
Information on broad factors external to your company (e.g. economic conditions, population growth)	6	11.09	20
Mean of the group		**13.42**	
• **Timeliness and frequency of reporting**			
Reports are provided frequently on a systematic, regular basis (e.g. daily, weekly reports)	1	17.33	1
Relevant information is supplied to managers automatically upon its receipt into information systems or as soon as processing is completed	2	15.15	8
Information that enables managers to monitor and control activities is available immediately upon request	3	14.69	10
There is no delay between an event occurring (e.g. competitors' actions, market demand) and relevant information being reported to managers	4	11.31	19
Mean of the group		**14.62**	
• **Aggregation**			
Information is provided on the different sections or functional areas in your company (e.g. marketing and production, or sales, cost, or profit centres)	1	16.93	2
Information on the effect of different sections' activities on summary reports (e.g. profit, cost, and revenue reports for other sections)	2	16.61	3
Information on the effect of events on particular time periods (e.g. monthly/ quarterly /annual summaries, trends, comparisons)	3	15.89	6
Information that has been processed to show the influence of events on different functions, such as marketing or production, associated with particular activities or tasks***	4	15.40	7
Information provided in formats suitable for input into decision models (e.g. discounted cash flow analysis, incremental or marginal analysis, inventory analysis, credit policy analysis)	5	14.57	11
Information in formats which enable managers to conduct "what if" analysis	6	13.04	16
Mean of the group		**15.40**	
• **Integration**			
Information on precise targets for the activities of all sections within your company	1	15.93	5
Information on the impact that your decisions will have on other sections in your company	2	14.00	12
Information that relates to the impact that your decisions would have on the performance of your whole company	3	13.61	13
Information on the influence of other individuals' decisions on your area of responsibility****	4	13.21	15
Mean of the group		**14.16**	
Overall mean of the usefulness of MAI		**14.41**	

* Rank among the group, ** Rank among all items, *** n=53, **** n=52

As it can be seen from Table 5.21, the aggregation dimension was the most useful dimension for planning, control and problem solving activities with a mean score of 15.40. This result was expected as the MAI related to this dimension were also the most important as well as available information. Similarly, timeliness and frequency of reporting of MAI usefulness was considered the second most useful information as it was ranked in the same position regarding the importance and availability of MAI. However, this was not the case for both scope and integration dimensions. Table 5.22 summarises the rank of the characteristics of MAI with respect to their importance, availability, and usefulness.

Table 5.22 Mean Ranking of the Characteristics of MAI

Information characteristics	Importance	Availability	Usefulness
Scope	3	4	4
Timeliness and frequency of reporting	2	2	2
Aggregation	1	1	1
Integration	4	3	3

Although the usefulness of MAI is determined by both importance and availability, the above results support the idea that the availability of MAI is more relevant to them to be useful.

Overall, the sampled large manufacturing companies operating in Libya are likely to benefit from all four dimensions of MAI characteristics in planning, control and problem solving activities with a mean value of 14.41, and their usefulness was ordered as the same as their availability.

5.8 Summary and Conclusion

The data presented in this chapter focus on the strategy formulation process, adoption of MCS types, and the characteristics of MAI in large manufacturing companies operating in Libya. It also has distinguished between companies who placed more emphasis on cost leadership priorities and companies who emphasised more product differentiation priorities.

In respect of strategy formulation process, formal and systematic procedures as well as organised activities have guided this process, and though, different groups/people have involved in shaping companies' strategies, senior managers (e.g. CEO) seem to be the most groups/people participated in formulating the three levels of strategy, corporate, competitive, and operational, in large manufacturing companies in Libya.

In addition, no pure cost leaders or differentiators were found, rather these companies have taken into account various features, to different degree, of cost leadership priorities and product differentiation priorities when shaping their competitive strategy. Therefore, companies were classified cost leaders when they placed more emphasis on cost leadership priorities than on product differentiation priorities, and were classified differentiators as they emphasised more product differentiation priorities than cost leadership priorities.

Although the sampled companies claim high role of MAI in both strategic priorities, these information were found more relevant to cost leadership priorities, as these companies relies more on traditional MAPs, the sub-system of their MCS.

Regarding the adoption of MCS types, large companies have adopted more bureaucratic MCS types in motivating, controlling and directing different activities. Formal, tight, action, and impersonal controls were the main features of MCS adopted in large manufacturing companies in Libya. However, these MCS were relatively low restricted controls.

In addition, these companies assert the importance of all dimensions of MAI for planning, control and problem solving activities, although higher importance is derived from aggregated information. On the other hand, the availability of MAI was

not as high as their importance. The availability of all four characteristics of MAI, in general, and scope dimension in particular, was perceived relatively low by the large manufacturing companies in Libya. This explains the greater reliance on formal accounting controls practices (i.e. traditional MAPs) by the Libyan companies as reported in earlier studies (e.g. Abulghasim, 2006, Leftesi, 2008).

Although, the usefulness of MAI was resulted from a calculation of the importance and availability that attached to all items, the degree of usefulness appears to be more dependable on the degree of availability, as if information are available and important, they are certainly would be useful. In this context, all dimensions of MAI were perceived useful by large manufacturing companies in relation to decision-making and controlling as well as problem solving activities; albeit, the aggregated information was the most beneficial ones.

The next two chapters present the results of the statistical analysis tests of the research hypotheses.

Chapter Six

Types and Effectiveness of MCS and the Relationship with Organisational Characteristics

6.1 Introduction

The purpose of this chapter is to present and discuss the results obtained for the first and second group of hypotheses. Six hypotheses within the first group were devoted to accomplish the first three research objectives, which are:

- To examine the strategy formulation process in large manufacturing companies in Libya, and the role of MAI in this process.
- To identify the perceived usefulness of MAI in these companies.
- To identify the types of MCS, their relationship with competitive strategy and effectiveness in these companies.

The second group consists of five hypotheses that are related to objective four, which is:

- To examine the relationship between contingent variables and the effectiveness of MCS, and the role of MAI usefulness in these relationships.

Independent t-test, correlation analysis, and simple regression were carried out to examine the first group of hypotheses. The independent t-test is used to test the difference between cost leaders and differentiators companies in relation to some variables, whereas simple regression and correlation analysis are used to examine the relationship between specific variables. Similarly, in the second group, simple regression is used to test the individual influence of the selected contingent variables on the MCS effectiveness. In addition, multiple regression is utilised to examine the concurrent influence of the contingent variables on MCS effectiveness to identify the portion of variance in the dependent variable these variables can explain.

This chapter is organised as follows: in the next three sections, research variables measurement, descriptive statistics of the research variables, and checking the tests

assumptions are presented. The fifth section introduces the findings of independent t-test regarding the differences between cost leaders and differentiators in terms of strategy formulation, usefulness of MAI, and MCS types as well as the results of correlation analysis related to the strategic role of MAI in both strategic priorities. Findings from simple regression tests regarding the potential influence of organisational variables on the effectiveness of MCS, and the assessment of the overall fit of the multiple regression test model are presented in section six.

6.2 Research Variables Measurements

As mentioned in Chapter Four (Section 4.4), the research hypotheses were formulated and organised into three groups and different tests were used to examine each group of hypotheses. Consequently, variables may vary in their nature from one group to another.

The first group encompasses six hypotheses and is mainly concerned with testing the difference between companies that placed more emphasis on cost leadership priorities and those that placed more emphasis on product differentiation priorities in relation to strategy formulation, usefulness of MAI, and the adoption of MCS types. Initially, competitive strategy was measured using several items on a five-point scale (Question C4), and later this variable was converted to a categorical variable comprising three categories in order to distinguish between cost leaders, differentiators and focus companies. The first two categories are the comparison criterion in this group (see Chapter Five, sub-section 5.4.1). Five point Likert scales were used to measure the rest of the variables namely: strategy formulation process (Question C3), usefulness of MAI (Questions F1-F4), and MCS types (Question E2), although the usefulness of MAI variable was resulted from a calculation method of two scales (see Chapter Five, sub-section 5.7.3).

Simple regression test and correlation analysis were employed to examine three hypotheses within this group. The possible influence of competitive strategy on MCS types was tested using simple regression. Again, a five-point Likert scale was used to measure the adoption of MCS types. Correlation analysis was applied to examine the role of MAI, on the one hand, in cost leadership priorities and, on the other hand, in

product differentiation priorities. Likewise, five point Likert scales were used to measure the role of MAI in cost leadership priorities (Question C5a), cost leadership priorities (Question C4a), the role of MAI in differentiation priorities (Question C5b), and differentiation priorities (Question C4b).

Regarding the second and third group of hypotheses, the same independent variables and dependent variable were used; although each group aims to examine a slightly different relationships, as the latter consider the influence of a third variable (i.e. mediator). In this context, the independent variables including centralisation (Question D1), formalisation (Question D2), environmental uncertainty (Question D3), level of manufacturing process complexity (Question D6), and competitive strategy (Question C4) were measured using five point scales. Similarly, the effectiveness of MCS, the dependent variable for group two and three, was measured on a five point Likert scale. Three items in Question E1 were used to measure this dependent variable. These items were resulted from conducting factor analysis to Question E1 items (see Chapter Five, sub-section 5.6.1). The items were: the current MCS is sufficiently adequate for the company, the MCS exists mainly to ensure successful implementation of strategy, and MAI is vital for the MCS.

The final group, which is dealt with in the next chapter, takes the simple contingency relationships examined in the second group to a more complex level by introducing the potential influence of a third variable, namely the mediator (i.e. usefulness of MAI). Specifically, this group of hypotheses is devoted to examining the potential influence of the usefulness of MAI on the relationship between the selected contingent variables (independent) and MCS effectiveness (dependent). Accordingly, when applying the mediation regression test, the mediator is treated first as a dependent variable, and second as an independent variable. Therefore, MAI usefulness is the dependent variable with respect to the contingent variables, and the independent variable in relation to MCS effectiveness.

Given the metric nature of the two dependent variables measurement (i.e. MCS types and MCS effectiveness), simple as well as multiple regression tests are utilised as pointed out in Chapter Four and, considered appropriate to investigate the contingent

variable(s) that might influence, the effectiveness of MCS. Details regarding the questions and number of items used as well as the Cronbach Alphas for the investigated variables were presented in Chapter Four (see Table 4.7). The following two sections present the descriptive statistics of these variables and check the assumptions of tests that were used to examine the research hypotheses, respectively.

6.3 Descriptive Statistics of the Research Variables

The minimum, maximum, mean, and standard deviation of the variables (i.e. dependent and independent) related to the research hypotheses are presented in Table 6.1. The variable named strategic priority is a categorical variable and will be dealt with as two sub-variables, cost leaders and differentiators, when testing the relevant hypotheses.

Table 6.1 Descriptive Statistics of the Research Variables

Research Variable	Min	Max	Mean	S.D
MCS types	1.60	4.60	3.4901	.77293
Competitive strategy	2.00	4.92	3.7735	.76493
Cost leaders' priorities	2.00	5.00	3.9676	.76640
Product differentiation priorities	1.78	5.00	3.6872	.81538
Strategy formulation	1.90	5.00	3.4981	.84552
Role of MAI in cost leaders priorities	3.00	5.00	4.3000	.66200
Role of MAI in product differentiation priorities	2.00	5.00	4.1300	.75400
Usefulness of MAI	3.40	25.00	14.4105	4.86699
Centralisation	1.00	4.88	2.8681	1.04029
Formalisation	1.00	5.00	3.7778	.84489
Environmental uncertainty	1.67	5.00	3.5082	.82715
Manufacturing complexity	1.20	4.60	3.2935	.76615
MCS effectiveness	1.50	5.00	4.0093	.74442
Strategic priority	1.00	3.00	1.3519	.55482

6.4 Tests Assumptions [8]

As mentioned in Chapter Four (Subsection 4.14.2), the independent samples t-test was used to examine the difference between two types of companies (i.e. emphasised more on cost leadership priorities or on product differentiation priorities) in relation to strategy formulation process, the usefulness of MAI, and the adopted types of MCS. This test was applied to these variables as it compares a variable with two categories (strategic priority) with a variable made up of scale data (interval). However, several assumptions needed to be met to obtain accurate results when conducting this test.

In this context, checking the assumptions of t-test have been recommended by many authors (e.g. Tabachnick and Fidell, 2007, Field, 2009). The most common assumptions that should be acknowledged are normality, homogeneity of variance, and independence. For the latter assumption, data were collected from different group of participants, therefore this assumption was met. The assumption of normality could be examined and checked using different methods. It could be checked statistically by using Skewness [9] and Kurtosis [10] value tests. The acceptable values of Skewness and Kurtosis to confirm normal distribution are within the range of -1 to +1 and -3 to +3 respectively (Hair et al., 2003). Table 6.2 shows that the values of Skewness as well as Kurtosis for all variables fall within the accepted range confirming the normality assumption. In addition, normality could be examined graphically using histograms (a bell-shaped curve) and normal probability plot (P-P Plot). The histogram and P-P Plot in Figures 6.1 to 6.8 show that the distribution of all variables are convincing as normal, although MCS types bell shape is slightly skewed to right and some of the observed values, as few P-P Plots show, deviate slightly from the straight line.

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[8] For the purpose of this research some of the shared assumptions between different tests are checked together in this section.

[9] Skewness measures the departure from a symmetrical distribution. A negatively skewed distribution occurs when the tail stretches to the left (smaller values), while a positive one occurs if the tail stretches to the right (larger values) (Hair et al., 2003).

[10] Kurtosis measures the peakedness or flatness of a distribution. The distribution is too peaked when there are large positive values, whereas it is too flat if there are large negative values (Hair et al., 2003).

Therefore, it can be concluded from the bell-shaped curves and P-P Plots that the assumption of normality of the variables has been met.

On the other hand, homogeneity of variance implies no difference in the variance throughout the data, and this could be checked using Levene's test. According to Field (2009) if the Levene's test is insignificant (i.e. $p > .05$ based on the mean) the variances are nearly equal and the assumption is tenable. Table 6.2 indicates that the variances were equal (i.e. $p > .05$) for all related variables within the two groups (i.e. cost leaders and differentiators). Based on the above results, it can be concluded that the assumptions of independent t-test have been satisfied.

Table 6.2 Normality Statistical Tests of the Dependent Variables

Variable	Skewness	Kurtosis	Levene's (Sig.)
Strategy formulation	-.042	-.827	.812
MAI usefulness	.121	-.475	.658
Scope	.271	-.519	.607
Timeliness	.171	-.789	.781
Aggregation	-.014	-.642	.856
Integration	.268	-.510	.052
MCS types	-.556	-.402	.634
Formal	-.447	-.434	.307
Tight	-.682	-.492	.775
Action	.281	-.516	.970
Impersonal	-.490	-.852	.437
Restricted	.443	-.416	.254
MCS effectiveness	-.977	1.403	-

As mentioned in Chapter Four (Subsection 4.14.3) some hypotheses are tested utilising simple as well as multiple regression, which require addressing additional assumptions apart from the previous ones, in order to interpret and generalise the results accurately. One of these additional requirements is the variables type. The independent variables (predictor variables) must be quantitative (i.e. continuous scale such as interval or ratio) or categorical (with two categories), and the dependent variables must be quantitative, continuous, and unbounded. In this study, the independent variables as well as dependent variables in the regression analysis was measured using 5-point Likert scale which has been commonly treated as approximately interval (Field, 2009).

Figure 6.1 The Histogram of Strategy Formulation Process

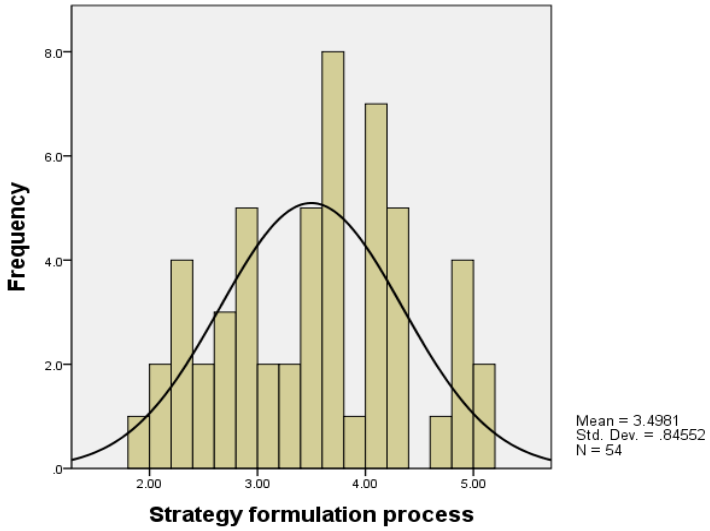


Figure 6.2 Normal P-P Plots of Strategy Formulation Process

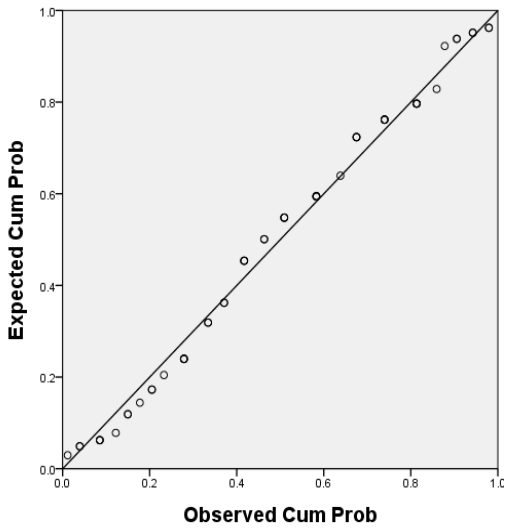


Figure 6.3 The Histogram of MAI Usefulness

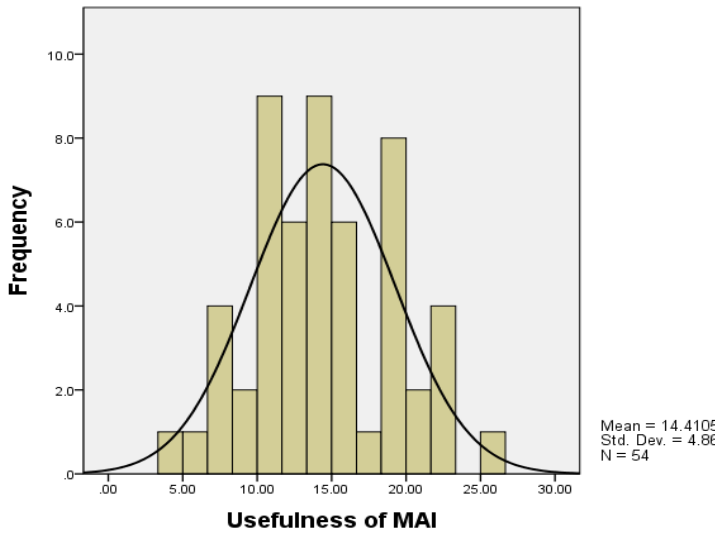


Figure 6.4 Normal P-P Plots of MAI Usefulness

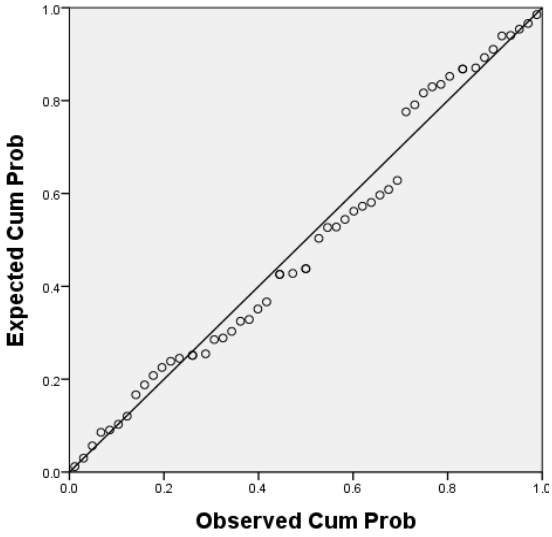


Figure 6.5 The Histogram of MCS Types

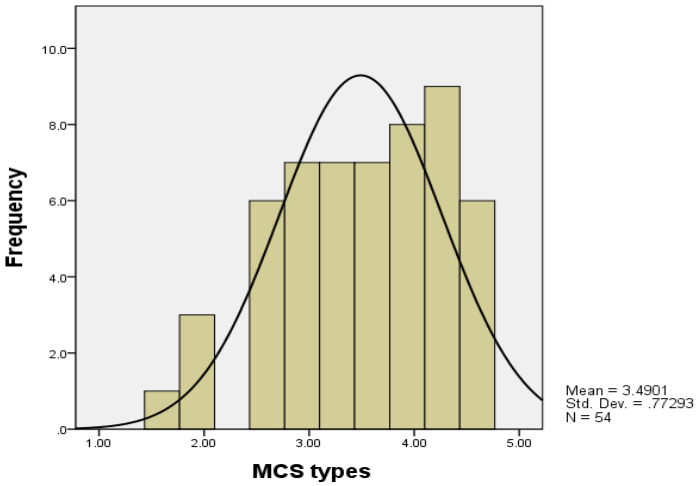


Figure 6.6 Normal P-P Plots of MCS Types

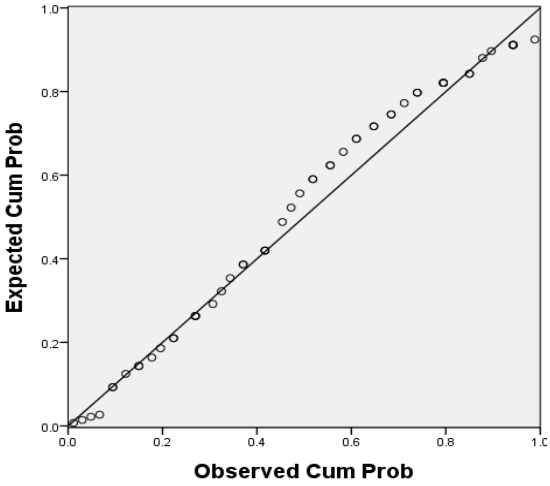


Figure 6.7 The Histogram of MCS Effectiveness

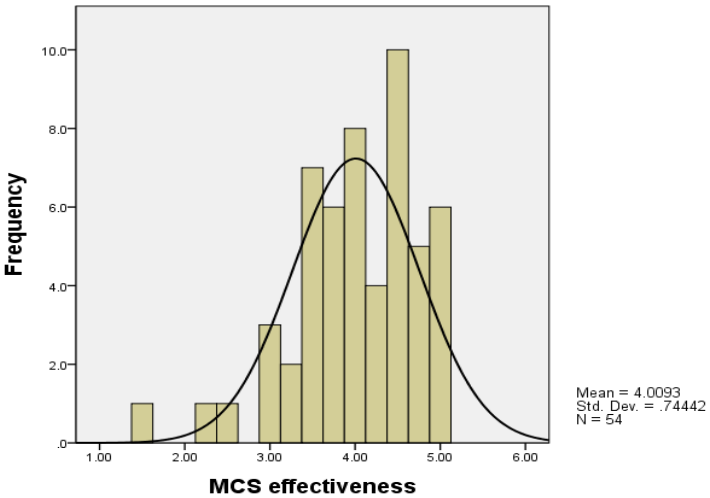
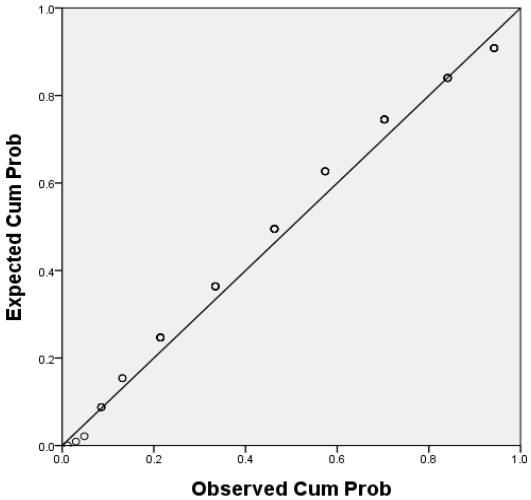


Figure 6.8 Normal P-P Plots of MCS Effectiveness



In a multiple regression test, multicollinearity is another important assumption that should be checked. It refers to the degree of correlation between the independent variables. If a strong correlation exists between two variables, this will cause problems when assessing the individual importance of each independent variable in the success of the model. One simple way of identifying multicollinearity is to scan a correlation matrix of all independent variables and find out if there is any strong correlation (i.e. correlations of above .80 or .90) (Field, 2009). However, there are two other precise tests that have been developed by statisticians to determine whether multicollinearity is very high and can cause problems. These are the variance inflation factor (VIF) and its reciprocal (1/ VIF) the tolerance value. It has been recommended that 10 or less would be an acceptable value of VIF, and for the tolerance value should be above 0.1 (Field, 2009, Hair et al., 2011). Table 6.3 shows that there is no high correlation between the independent variables, and Table 6.6 shows that the values of VIF did not exceed the accepted value of 10 as well as no value fall below the acceptable value of 0.1 regarding the tolerance values. Thus, it can be concluded that there is no evidence of multicollinearity in this case.

Table 6.3 Correlation between the Independent Variables

Variable	1	2	3	4	5	6
1. Centralisation	1.000					
2. Formalisation	.533**	1.000				
3. Environmental uncertainty	.609**	.666**	1.000			
4. Manufacturing process complexity	.347*	.373**	.461**	1.000		
5. Competitive strategy	.453**	.693**	.709**	.252	1.000	
6. MAI usefulness	.536**	.681**	.647**	.280*	.640**	1.000
7. Scope	.444**	.511**	.643**	.230	.586**	-
8. Timeliness	.504**	.697**	.519**	.188	.593**	-
9. Aggregation	.549**	.680**	.635**	.292*	.598**	-
10. Integration	.418**	.569**	.482**	.298*	.517**	-

* $p < .05$; ** $p < .01$

6.5 Data Analysis Related to the Characteristics of Cost Leaders and Differentiators

The aim of this section is to test the differences between cost leaders and differentiators companies in relation to some characteristics. It presents the results of independent *t*-test related to testing ***H1***, ***H4***, and ***H6***, simple regression test related to examining ***H5***, and correlation analysis related to testing ***H2*** and ***H3***.

6.5.1 Strategy Formulation

H1 There is significant difference between cost leaders and differentiators in the strategy formulation process.

Table 6.4 shows that there is no statistically significant difference in the strategy formulation process mean scores between cost leaders and differentiators [t (50) = -.449, p >.05]. Therefore, ***H1*** was rejected.

The finding supports the argument that has been made by several authors in the strategic management literature (e.g. Dent, 1990, Porter, 1996, Mintzberg and Lampel, 1999) that strategy should be formulated on formal systematic bases and supported by many techniques as well as actions.

Table 6.4 Cost Leaders (CLs) and Differentiators (DFs): Independent t-test Results

Variables	***All sample*** *(n=54)*		***CLs*** *(n=37)*	***DFs****(n=15)*	***t***	***df***	***Sig.***
	H	***M(SD)***	***M(SD)***	***M(SD)***			
Strategy formulation	*H1*	3.50(.85)	3.45(.88)	3.59(.85)	-.499	50	.620
Usefulness of MAI	*H4*	14.41(4.87)	14.15(4.66)	14.68(5.52)	-.355	50	.724
Scope		13.42(5.23)	13.14(4.97)	13.47(5.81)	-.202	50	.841
Timeliness		14.62(5.85)	14.14(5.76)	15.35(6.32)	-.670	50	.506
Aggregation		15.40(5.39)	14.79(5.37)	16.10(5.58)	-.677	50	.501
Integration		14.16(5.21)	14.40(4.69)	13.64(6.71)	.465	50	.644
MCS types	*H6*	3.49(.77)	3.48(.77)	3.48(.84)	.012	50	.991
Formal		3.65(.88)	3.64(.85)	3.65(1.02)	-.029	50	.977
Tight		3.51(1.00)	3.47(.99)	3.59(1.06)	-.376	50	.709
Action		3.00(1.06)	2.89(1.07)	3.13(1.06)	-.737	50	.465
Restricted		2.72(.96)	2.78(1.03)	2.60(.83)	.614	50	.542
Impersonal		3.52(1.33)	3.73(1.22)	3.00(1.56)	1.804	50	.077

The empirical evidence of a comparative study between developed and less developed countries by Demirbag et al. (2010) found that Turkish firms tend to be superior to the

British firms in terms of the efficiency of their strategic decision making process, implying that firms in developing countries do follow particular procedures to set their plans and goals. Similarly, the above results indicate that cost leaders and differentiators companies operating in Libya shape their strategies on formal and relatively organised procedures, as the mean scores were 3.45 and 3.59 respectively. Specifically, on average, customer focus and attaining and sustaining competitive advantage as well as the linkage between present and early strategies are the most important criteria when formulating the company's strategy (see Chapter Five, Table 5.6). However, the reliance on some strategic thinking methods (e.g. SWOT) is less than the average score (3.00).

6.5.2 Strategic Role and Usefulness of MAI

H2 MAI plays an important role in cost leadership priorities.

A Spearman correlation coefficient was computed to assess the relationship between MAI and the priorities of cost leadership. The results indicate that there is a moderate positive correlation between MAI and cost leadership priorities (*rho* = .480, *n* = 54, *p* < .001) conforming the existence of such relation. Therefore, the research hypothesis (***H2***) is accepted.

H3 MAI plays an important role in differentiation priorities.

Similarly, in order to assess the relationship between MAI and the differentiation priorities, a non-parametric (i.e. Spearman) correlation coefficient was conducted and the results revealed a moderate positive relationship between the two variables (*rho* = .410, *n* = 54, *p* = .002). Consequently, ***H3*** is accepted.

Although the correlation coefficient for both priorities in ***H2 and H3*** was positive and moderate as well as statistically significant, MAI seems to be more relevant to cost leadership priorities (mean = 4.30) than product differentiation priorities (mean = 4.13) in large manufacturing companies operating in a developing country, namely Libya.

The results support the finding reported in the literature in relation to the vital role of MAI in cost leadership as well as product differentiation priorities (e.g. Mia and Chenhall, 1994, Chenhall and Morris, 1995, Bouwens and Abernethy, 2000, Naranjo-Gil and Hartmann, 2006). For instance, Chenhall and Morris (1995) found that MAI was important for companies follow entrepreneurial strategy and their counterpart who follow conservative strategy. Also Naranjo-Gil and Hartmann (2006) reported that MAI influences the strategic priorities implementation. However, this does not exclude the fact that results from other research found partial or no role of MAI in strategic priorities (e.g. Mia and Chenhall, 1994, Bouwens and Abernethy, 2000).

Based on the above results obtained from testing ***H2*** and ***H3***, the following hypothesis takes the analysis step further and attempts to discover whether the managers of cost leaders and differentiators companies perceive the usefulness of MAI equally or not.

H4 There is significant difference between cost leaders and differentiators in the usefulness of MAI.

Although there are variations in the mean scores of the individual MAI dimensions with, for example the differentiators attaching more importance to scope, timeliness and aggregate MAI, the statistical results presented in Table 6.4 reveal no significant difference between cost leaders and differentiators in their overall mean scores of the usefulness of MAI [t (50) = -.355, $p > .05$]. Thus, ***H4*** was rejected.

The above results are consistent with the findings of recent studies, such as Abdel-Kader and Luther (2008) and Naranjo-Gil and Hartmann (2006), that cost leaders perceived MAI useful as differentiators do. However, this was not the case for other studies. For instance, Chenhall and Langfield-Smith (1998c) found that differentiators benefit more from contemporary MAPs compared to cost leaders. Similarly, Abernethy and Guthrie (1994) reported that MAI are more useful for companies adopting prospectors priorities than others who followed defenders priorities in relation to organisational performance. One possible explanation for this contradiction

is the increasing part of MAI in business recently, as the utilisation of such information is supported regardless of the strategic priorities being pursued.

As mentioned in Chapter Four, the "usefulness of MAI" measurement is the aggregate usefulness of four MAI dimensions, namely scope, timeliness, aggregation, and integration. Therefore, it is possible to test if there is any significant difference between these two types of companies in the usefulness of each dimension. As can be seen from Table 6.4, there was a difference between cost leaders and differentiators in the means score of all four dimensions (most notable in the case of aggregation dimension). However, the independent t-test results indicate that there is no significant difference between cost leaders and differentiators companies in their mean score of the usefulness of scope [t (50) = -.202, p > .05], timeliness [t (50) = -.670, p > .05], aggregation [t (50) = -.677, p > .05], and integration [t (50) = .465, p > .05], confirming the overall result of ***H4***.

The above findings possibly seem to indicate that large manufacturing companies in Libya attach equal usefulness to external, non-financial, future oriented and other types of information in planning, controlling and problem solving activities. This is consistent with earlier studies by Chenhall and Morris (1995) and Naranjo-Gil and Hartmann (2006) who reported the essential role of MAI in the strategy formulation process regardless of the followed strategic priorities.

6.5.3 Choice of MCS Type

H5 Competitive strategy influences the adoption of MCS types.

A simple regression test was conducted for this hypothesis and the results indicate that competitive strategy has a significant influence on the adoption of MCS types. The F value is 74.090, which is significant at the .05 level. Competitive strategy is positively predicting the adoption of MCS types with a beta value of .767 (t = 8.608). Additionally, the independent variable can explain 58.8% (R^2) of the variance in the dependent variable. Hence, ***H5*** is fully accepted.

In general, the results support the findings reported by previous MAS/MCS literature, theoretical as well as empirical, about the influence of competitive strategy on the design of MCS indicating the strong relationship between them (e.g. Simons, 1987, Bruggeman and Van der Stede, 1993, Chenhall, 2007, Langfield-Smith, 2007).

To what extent there are differences between cost leaders and differentiators in relation to the adoption of MCS types is examined next.

H6 There is significant difference between cost leaders and differentiators in the adoption of MCS types.

The independent *t*-test results provided in Table 6.4 show that, on average, cost leaders and differentiators have equal mean scores of 3.48 indicating that both types of companies have employed more bureaucratic MCS. Although cost leaders mean scores on tight, action, restricted, impersonal controls differ slightly from those of differentiators (see Table 6.4), no significant difference was found between them in the adoption of MCS type [t (50) = .012, $p > .05$]. Hence, ***H6*** is rejected.

These findings are not consistent with those of previous studies which reported differences between cost leaders and differentiators in relation to the adoption and design of MCS types (e.g. Bruggeman and Van der Stede, 1993, Jermias and Gani, 2004, Auzair and Langfield-Smith, 2005). For instance, Auzair and Langfield-Smith (2005) found that cost leaders placed emphasis on more bureaucratic MCS, whereas differentiators emphasised less bureaucratic MCS. That is may be due to the level of structure aspects exercised in these companies (i.e. centralisation = 2.87, formalisation = 3.78), and also the involvement of the government in these companies, as more than half of them are State-owned, could be another possible explanation for these findings.

In this study, however, MCS types were measured and tested on the basis of five distinctive features of control including formal, tight, action, impersonal, and restricted; more light could be shed on the overall result obtained by examining the difference between cost leaders and differentiators in relation to these five controls.

Independent t-test results shown in Table 6.4 indicate that there is no significant difference between the two groups of companies in their means score on formal control [t (50) = -.029, $p > .05$], tight control [t (50) = -.376, $p > .05$], action control [t (50) = -.737, $p > .05$], restricted control [t (50) = .614 $p > .05$], and impersonal control [t (50) = 1.804, $p > .05$]. These findings are in accordance with the earlier results related to the bureaucratic MCS applied in the sampled companies, and some of them are consistent with previous studies results. For instance, Bruggeman and Van der Stede (1993) concluded that tight controls were in favour of companies following cost leadership priorities and of those adopting product differentiation priorities and producing standard products. Similarly, Jermias and Gani (2004) found that differentiators and cost leaders used output controls, although the usage of these type of controls was more intensively by the differentiators. However, the findings disagree with Simons (1987) who concluded that only prospector (differentiators) companies placed more emphasis on tight budget controls.

Additional possible explanation for the similarities between cost leaders and differentiators in relation to the above results that is as most of these large manufacturing companies operating in Libya produce standardised, undifferentiated products (i.e. 70.4% of them employ traditional, non-advanced production systems), it is expected that traditional MCS, which mainly financial controls, would be more appropriate and applied to monitor, control and direct activities (Chenhall, 2007).

6.6 Data Analysis Related to the Influence of Organisational Variables on MCS Effectiveness.

This section aims to examine the first level of contingency relationships that may exist between organisational variables (independent variables) and MCS effectiveness (dependent variable). The research hypotheses related to these variables were developed based on the research theoretical framework (see Chapter One, Section 1.6).

Before identifying these relationships, some important issues related to utilising simple and multiple regression tests are introduced. First, the traditional level of significance ($\alpha = .05$) was chosen as it is the most popular level. Second, generalising

the results of a regression model depends on the ratio of respondents to the number of indicators. According to Field (2009) the most common approach is that 10 respondents for each independent variable in the model, or 15 respondents per independent variable. On the other hand, Hair et al. (1998) stated that the minimum acceptable ratio is five respondents per one independent variable and the desired level is between 15 to 20 respondents to each independent variable. In this research the ratio is about 11 to 1, which is acceptable, despite the fact that this research sample comprises the entire population of large manufacturing companies in Libya.

Table 6.5 summarise the results of computing simple regression in relation to the potential influence of the contingent variables on the effectiveness of MCS. From the same table, it can be seen that all variables, except manufacturing process complexity, were found to have significant influence on MCS effectiveness. Related hypotheses are tested and discussed in the forthcoming five subsections.

6.6.1 Centralisation

H7 Centralisation, as an aspect of organisational structure, influences the effectiveness of an MCS.

Results related to testing hypothesis ***H7*** indicate that centralisation of the companies has a statistically significant influence on the effectiveness of MCS (see Table 6.5, F value = 16.875, $p < .001$). The value of R^2 for this variable is .245, which implies that centralisation explains 24.5% of the variance in the effectiveness of MCS. In addition, the beta value is .495, which indicates a positive influence of centralisation on MCS effectiveness. Therefore, ***H7*** is fully accepted.

Table 6.5 Influence of Organisational Variables on MCS Effectiveness

Variable	***H***	***R^2***	***F***	***B***	***S.E***	***Beta***	***t***	***Sig.***
Centralisation	H7	.245	16.875	.354	.086	.495	4.108	.000
Formalisation	H8	.614	82.566	.690	.076	.783	9.087	.000
Environmental uncertainty	H9	.400	34.638	.569	.097	.632	5.885	.000
Manufacturing complexity	H10	.070	3.894	.256	.130	.264	1.973	.054
Competitive strategy	H11	.405	35.415	.619	.104	.637	5.951	.000

The above findings, related to centralisation, are consistent with earlier studies by Bruns and Waterhouse (1975), Merchant (1981), Gul and Chia (1994), Chia (1995), and Chang et al. (2003) that companies with lower levels of centralisation provide managers more flexibility and supported with relevant information to make the appropriate decisions which positively influenced the organisational systems (MAS/MCS) and performance.

6.6.2 Formalisation

H8 Formalisation, as an aspect of organisational structure, influences the effectiveness of an MCS.

The statistical results related to hypothesis ***H8*** in Table 6.5 show the largest F value of 82.566 is statistically significant at the .05 level. Thus, formalisation of the companies has a significant influence on the effectiveness of MCS. Moreover, large percentage (i.e. 61.4%) of MCS effectiveness variance is explained by the formalisation aspect, as R^2 is .614. Furthermore, the relation between formalisation and the effectiveness of MCS is positive with relatively high beta value of .783.

According to the above results in relation to testing ***H8***, it can be concluded that formalisation has a positive influence on the MCS effectiveness. Therefore, the research hypothesis (***H8***) is fully accepted.

The above result confirms the findings of previous studies regarding the influence of formalisation on the MCS effectiveness (e.g. Fredrickson, 1986, Nicolaou, 2000, Gerdin, 2005). For instance, Gerdin (2005) reported that formalisation and organisation interdependence had a combined effect on the effectiveness of MAS design.

Overall, the relatively high level of formalisation in large manufacturing companies operating in Libya (mean = 3.78 out of 5) provide a possible explanation to the types of MCS adopted in these companies (e.g. formal, action, tight).

6.6.3 Environmental Uncertainty

H9 Environmental uncertainty influences the effectiveness of an MCS.

From the statistical results related to testing hypothesis ***H9*** shown in Table 6.5, it can be noticed that environmental uncertainty influences the MCS effectiveness; the F value is 34.638, which is significant at the .05 level ($p < .001$). In addition, the value of R^2 is .400, and this would mean that environmental uncertainty accounts for 40% of the variation of the effectiveness of MCS. The independent and dependent variables are positively related, as the beta value is .632.

The results of regression tests revealed that the hypothesis (***H9***), that the environmental uncertainty has a positive influence on the effectiveness of an MCS, is supported.

These results support the findings of earlier studies related to the influence of environmental uncertainty on MCS effectiveness (e.g. Chenhall and Morris, 1986, Gul and Chia, 1994, Baines and Langfield-Smith, 2003, Abdel-Kader and Luther, 2008). For instance, Chenhall and Morris (1986) reported a positive relationship between environmental uncertainty and scope as well as timeliness of MAI, which in turn improved the ability to assess success or failure. In addition, Abdel-Kader and Luther (2008) found that under high uncertainty conditions, companies adopt more sophisticated MAPs to achieve tasks effectively. On the other hand, this result is inconsistent with Teerooven and Bhagtaraj (2008), who found no association between task uncertainty, MAI, and managerial performance. Whereas, King et al. (2010) found negative relationship between the extent of use of written budgets and environmental uncertainty.

6.6.4 Manufacturing Process Complexity

H10 The level of manufacturing process complexity influences the effectiveness of an MCS.

As shown in Table 6.5, the results related to testing hypothesis (***H10***) indicate that the level of manufacturing process complexity has no influence on the effectiveness of an

MCS, with an F value of 3.894, which is not statistically significant at the .05 level (Sig. = .054). Moreover, this level of complexity only explains 7% of the variance of MCS effectiveness. Although, the relation between them is not significant, it still positive with a beta value of .264.

Accordingly, there is no influence of the level of manufacturing complexity process on the MCS effectiveness, which implies that ***H10*** is rejected.

The above results are consistent with those of Abdel-Kader and Luther (2008), who found no relationship between production complexity and the level of MAPs sophistication. The finding here could implies that the manufacturing process in these companies is relatively static (producing standard products) and its effect on MCS may appear only through particular elements of these systems (e.g. MAI). However, regarding the direction and strength of the association, other studies in the operations and production management literature reported significant negative impact of manufacturing complexity on manufacturing plant performance (e.g. MacDuffie et al., 1996, Tor et al., 1999, Bozarth et al., 2009). On the other hand, Bruggeman and Slagmulder (1995) and Baines and Langfield-Smith (2003) who reported that changes in manufacturing technology led to changes in MCS/MAI which in turn improved the organisational performance, implying that the influence of manufacturing complexity could appear through MAI which is dealt with in a forthcoming chapter .

6.6.5 Competitive Strategy

H11 Competitive strategy influences the effectiveness of an MCS.

Results related to testing hypothesis (***H11***) shown in Table 6.5 indicate that competitive strategy has an influence on the MCS effectiveness, with a significant F value of 35.415 at the 0.5 level ($p < .001$). Further, competitive strategy explains 40.5% of the variance of MCS effectiveness, as R^2 is .405. Furthermore, the direction of this relation is positive, as the beta value is .637.

Unexpectedly, the results obtained for competitive strategy and environmental uncertainty are nearly identical which possibly means that they have the same effect on the effectiveness of MCS.

Based on the above results, the hypothesis (***H11***) that the competitive strategy has a positive influence on the MCS effectiveness is supported.

This result supports the finding reported in the literature regarding the influence of competitive strategy on the effectiveness of MCS (e.g. Govindarajan, 1988, Chenhall and Morris, 1995, Kober et al., 2003, Jermias and Gani, 2004, Naranjo-Gil and Hartmann, 2006). For instance, Kober et al. (2003) found positive relationship between MCS mechanisms and strategic priorities change, and suggested that a good match between MCS and strategy influences the organisational performance. On the other hand, the above results are inconsistent with Amoako-Gyampah and Acquaah (2008), who found no relationship between competitive strategy and organisational performance.

Additionally, the results of testing this hypothesis confirm those obtained from testing ***H5***, which implies that the competitive strategy influences the adoption/design of MCS as well as the effectiveness of these systems.

6.6.6 The Overall Fit of the Regression Test Model

Simple regression was used in the preceding sections to test the individual influence of each independent variable (organisational characteristics) on the dependent variable (MCS effectiveness). In the analysis that follows below, multiple regression is used to establish how much variance in the dependent variable could be explained by the independent variables when they are examined simultaneously. In other words, the aim here is to test the possible concurrent influence of the contingent variables on the MCS effectiveness.

Assessing the statistical significance of the overall regression model is a critical starting point in evaluation the overall regression model. This step could be done by looking at the model F value and its significance. In this case, Table 6.6 shows that F value is 17.608, which is significant at $p < .001$. This implies that the model enhanced

the ability to predict the outcome variable. In short, the regression model overall predicts the effectiveness of an MCS.

From the same table, R value (i.e. multiple R: is the correlation between the observed values of the dependent variable and the values of the same variable predicted by the multiple regression model) for this model is .804, which signifies that there is a strong correlation between these values. In addition, the table shows that all independent variables in this multiple regression model account for 64.7% of the variance of MCS effectiveness, as R^2 value is .647. In other words, 35.3% of the variance of the dependent variable cannot be explained by these organisational variables alone and there must be other variables have a potential influence and could explain part of this variation.

Table 6.6 Multiple Regression for Independent Variables Influencing MCS Effectiveness

Independent variables	*B*	*S.E*	*Beta*	*t*	*Sig.*	*Tolerance*	*VIF*
(Constant)	1.267	.383	-	3.312	.002	-	-
Centralisation	.040	.080	.056	.507	.614	.595	1.681
Formalisation	.538	.116	.611	4.657	.000	.427	2.342
Environmental uncertainty	.147	.133	.164	1.111	.272	.338	2.958
Manufacturing process complexity	-.080	.096	-.083	-.835	.408	.751	1.332
Competitive strategy	.090	.133	.092	.678	.501	.396	2.527
R = .804							
R^2 = .647							
F = 17.608							
Sig. < .001							
Adjusted R^2 = .610							

On the other hand, scanning through the values of the Standardised Coefficients (Beta) column presented in Table 6.6, it can be determined which of the variables included in the model contributed to the prediction of the dependent variable. In this case, the largest Beta value is .611, which is for formalisation. This implies that this variable makes the strongest unique contribution to explaining the effectiveness of MCS, when the variance explained by all other variables in the model is controlled for. The Beta value of environmental uncertainty was .164, indicating that it made less contribution. However, the contribution of formalisation is statistically significant (p

< .05), whereas environmental uncertainty is not making a significant unique contribution to the prediction of the independent variable, as the Sig. value is above .05.

The above result related to the collective influence of formalisation variable confirms the previous result in sub-section 6.6.2 that formalisation also has an individual influence on MCS effectiveness. In addition, the insignificant joint influence of manufacturing complexity is consistent with the finding in sub-section 6.6.4 therefore this variable has no significant influence on MCS effectiveness, neither a single influence nor a collective influence. However, no joint influence was found for centralisation, environmental uncertainty, and competitive strategy on MCS effectiveness, which disagrees with the individual influence found in the previous sub-sections in relation to these variables. Finally, as explained earlier, the VIF values and tolerance statistics presented in Table 6.6 show that no multicollinearity problem exists among the independent variables in this regression model.

6.7 Summary and Conclusion

This chapter has presented the statistical procedures used, and the findings from testing the first and second group of the research hypotheses. In the first group, the focus was on identifying the difference between cost leaders and differentiators companies in terms of strategy formulation process, usefulness of MAI, and the types of MCS. The results of this group revealed no significant difference between cost leaders and differentiators companies in relation to the three variables indicating that these companies follow formal systematic procedures when formulating their strategies, attach relatively equal usefulness to MAI to support the strategy formulation process, and adopt and use more bureaucratic MCS to implement and realise the chosen strategies.

The second group was concerned with examining the possible influence of organisational variables on the effectiveness of MCS according to the research theoretical model explained in Chapter One. Simple regression tests show that except manufacturing process complexity variable, all organisational variables were found to have initial influence on MCS effectiveness.

The initial effect of organisational variables on MCS effectiveness promoted the detection of mediating variable effect. Hence, the next chapter presents and discusses the findings of the third group of the research hypotheses, which is concerned with the possible mediating effect of MAI usefulness on the relationship between the selected contingent variables and MCS effectiveness.

Chapter Seven

The Mediating Role of MAI Usefulness in MCS Contingency Relationships

7.1 Introduction

The purpose of this chapter is to present and discuss the results obtained for the third group of hypotheses. Five hypotheses within this group were devoted to accomplish the second part of the fourth research objective, which is:

- To examine the relationship between contingent variables and the effectiveness of MCS, and the role of MAI usefulness in these relationships.

The first level of contingency relationships, which is concerned with the possible influence of the investigated organisational variables on the effectiveness of MCS, was examined in the previous chapter. The current chapter takes the analysis to a more complex level by examining the potential influence of a third variable, a mediator, on these relationships. More specifically, it aims to test the mediating role of the usefulness of MAI on the relationship between organisational variables (independent variables) and the effectiveness of MCS (dependent variable). Preacher and Hayes' (2004) macro is used to carry out the mediation regression test. This chapter begins with a brief description to the macro's output matrix. Next the third group of hypotheses are examined and the results are presented and discussed. This is then followed by a detailed analysis to the aggregate intervening effect of MAI usefulness in order to identify which dimensions of MAI (i.e. scope, timeliness, aggregation, and integration) contributed to this overall intervening effect. Summary and conclusions are presented in the final section.

7.2 Preacher and Hayes' (2004) Macro

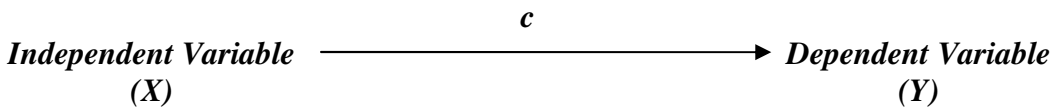
As mentioned in Chapter Four (Subsection 4.14.3), the intervening variable model (i.e. mediation, either full or partial, and indirect effect) is examined using Preacher and Hayes (2004) macro. Therefore, it is worthwhile to introduce some key aspects

related to the macro's outcome interpretation before carrying out the tests. The outcome matrix consists of the following three parts:

- **Direct and Total Effect**

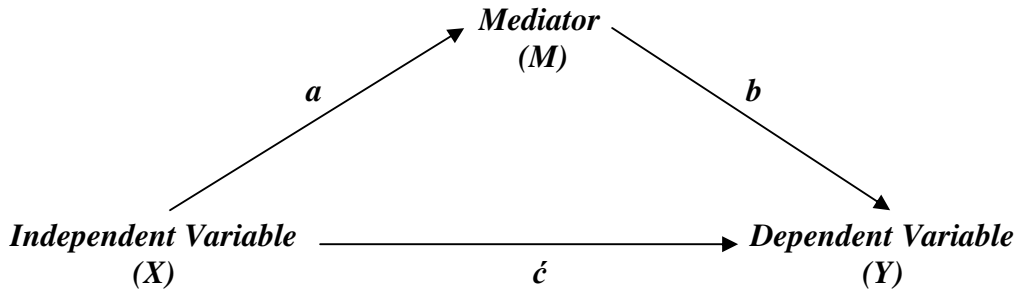
This part is concerned with the direct and total effect which is also known as the Baron and Kenny (1986) method (causal steps approach). There are four steps (i.e. regression models) in this part. The first step is to examine the total effect, which could be achieved by regressing the dependent variable (Y) on the independent variable (X). Figure 7.1, path *(c)*, illustrates this step.

Figure 7.1 The Total Effect



Next, as shown in Figure 7.2 path *(a)*, is the regression of the mediator (M) on the same independent variable (X). The third step is regressing (Y) on (M) while controlling for the effect of (X), as path (*b)* shows in the same figure. These two previous steps represent the indirect effect *(ab)*. Finally, regress (Y) on (X) while controlling for the effect of (M). Path *(ć)* in Figure 7.2 represents this step which is recognised as the direct effect.

Figure 7.2 Simple Mediation Relationship



In short, this first part is simply a four-step regression test, and it is recognised among many authors as the traditional approach for testing mediation relationships (e.g. Hayes, 2009, Rucker et al., 2011).

- **The Sobel Test**

This part deals with the indirect effect and significance using the normal distribution. While the causal steps approach outlined by Baron and Kenny (1986) involves several hypothesis tests, the Sobel (1982) test directly examines the primary question of interest whether or not the total effect of the independent variable (X) on the dependent variable (Y) is significantly reduced when adding a mediator to the model (Preacher and Hayes, 2004).

The output of this second part contains the estimate *"value"* of the indirect effect of (X) on (Y) through (M), which is either ***ab*** or ***c – ć***. It also provides a value of 'z' test and the level of confidence at 95% (two-tailed). Accordingly, the indirect relationship could be confirmed only when the value of Z-test is statistically significant (i.e. $Z > 1.96$, $p < .05$).

The Sobel test is frequently used as a supplement to the causal steps approach (i.e. Baron and Kenny approach) rather than instead of it (Hayes, 2009). However, in some occasions, the Sobel test contradicts with the causal steps results and suggests no indirect effect. In other words, this occurs when Baron and Kenny criteria are met, but the Sobel test is not (i.e. $z \leq 1.96$, $p > .05$). This contradiction is mainly due to the assumption that the distribution of ***ab*** or ***c – ć*** follows a normal distribution, which is questionable especially in small size samples (Preacher and Hayes, 2004). However, it is possible to overcome this issue by bootstrapping the sampling distribution of ***ab***, which is discussed next.

- **Bootstrapping**

The final part of the outcome is a non-parametric approach that produces a test which is not based on large sample theory, implying that it can be utilised confidently to a smaller size samples (Preacher and Hayes, 2004, Hayes, 2009). The outputs of the macro matrix provide a bootstrap estimate of the indirect effect ***ab*** (*mean*), an estimated standard error (*S.E*), and both 95% as well as 99% confidence intervals for the population value of ***ab***. The idea of bootstrapping is to take a large number of samples of size ***n***, where ***n*** is the original sample size, from the data, sampling with

replacement, and compute the indirect effect ***ab*** in each sample (Preacher and Hayes, 2004).

In order to determine whether the indirect effect is significantly different from zero at $p < .05$, the values of both the lower limit of 95% confidence interval (LL 95 CI) and upper limit of 95% confidence interval (UL 95 CI) needed to be inspected. The true indirect effect is estimated to lie between the values of these two limits with 95% confidence. If zero '0' is not in this confidence level (i.e. does not exist between the lower and upper limits values), only then can it be concluded that the indirect effect is indeed significantly different from zero with 95% confidence (i.e. $p < .05$).

According to Hayes (2009) bootstrapping is one of the more valid and powerful approaches for testing mediation variable effects in simulation research, apart from having the best control of Type I error. Moreover, he indicated that the typical choice of bootstrap samples is 1000, although he recommended at least 5000. Notwithstanding that bootstrapping usage is increasing, it is sometimes reported as a supportive method to the causal steps approach when detecting a mediation relationship.

- **Classifying the intervening effects**

In order to draw the right conclusions regarding the type of intervening effect that the model represents, including ***indirect effect*** as well as ***mediation****, partial or full*, Mathieu and Taylor (2006), among others (e.g. Baron and Kenny, 1986, Preacher and Hayes, 2004, Hayes, 2009, Kenny, 2011, MacKinnon, 2011, MacKinnon and Luecken, 2011) emphasised that there are some pre-conditions that should be considered before making any final decision when interpreting the results.

Accordingly, the ***indirect effect***, as a special form of intervening effect, appears when the independent variable (X) and dependent variable (Y) are not directly related (i.e. the total effect is not significant) and the only significant relations are the effect of (X) on the mediator (M), i.e. path (***a***), as well as the effect of (M) on (Y) controlling for (X), i.e. path (***b***), from the output of causal steps approach or the combined effect from Sobel test (***ab***). On the other hand, the ***full mediation*** form requires the effects

of: (X) on (Y), (X) on (M), and (M) on (Y) controlling for (X), to be statistically significant at the 0.5 level; but for the direct effect (X on Y controlling for M), to be non-significant (i.e. p > .05). In contrast, the case of ***partial mediation***, all four paths should be significant at the level of 95% confidence.

To conclude, the rationale of using Preacher and Hayes' (2004) macro is its suitability for small sample size, unlike the structural equation modelling (SEM) approach which is appropriate for large samples only. Moreover, it is also a powerful procedure as it relies on the products of the three tests to reach the final decision as well as not being very complicated to interpret the results and draw conclusions (Preacher and Hayes, 2004).

7.3 Data analysis Related to the Mediating Role of MAI Usefulness

The results of testing the hypotheses related to the mediating role of MAI usefulness (USMAI) on the relationship between organisational variables and MCS effectiveness (MCSEFC) are presented and discussed in the next five subsections. In order to avoid any confusion, it is useful to mention that in the coming analysis there will be some replication of the tests that have been conducted in the previous chapter (i.e. the initial influence of contingent variables on MCS effectiveness). This is because these tests are the first step of testing the intervening variable effect and it is more appropriate for the mediation results interpretation to bring all four steps together again.

7.3.1 Centralisation (CENT)

H12 The usefulness of MAI has a mediating effect on the relationship between centralisation and the effectiveness of MCS.

The statistical results related to testing ***H12*** (see Table 7.1 and Figure 7.3) indicate that the simple regression of MCS effectiveness on centralisation (MCSEFC*CENT) yields a significant total effect, $\boldsymbol{c}$ = .354, p < .001, and the indirect effect of centralisation on MCS effectiveness through MAI usefulness (i.e. ***ab***) is different from zero by 95% confidence interval based on 5000 bootstrap samples (.092 to .421, with a point estimate of .232), as are the paths from centralisation to MAI usefulness

(USMAI*CENT; a = 2.507, p < .001), and MAI usefulness to MCS effectiveness while controlling for centralisation (MCSEFC*USMAI. CENT; b = .090, p < .001). In contrast, the direct effect of centralisation on MCS effectiveness with controlling for MAI usefulness is not significantly different from zero at the level of 95% confidence interval (MCSEFC*CENT. USMAI; $ć$ = .129, p > .05).

Table 7.1 Results of the Mediating Effect of USMAI on the Relationship between CENT and MCSEFC

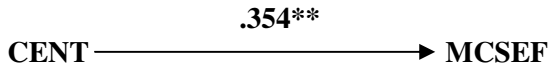
• *Causal steps approach*	*B*	*S.E*	*t*	*Sig.*
Path c (MCSEFC*CENT)	.354	.086	4.108	.000
Path a (USMAI*CENT)	2.507	.548	4.578	.000
Path b (MCSEFC*USMAI. CENT)	.090	.018	4.954	.000
Path ć (MCSEFC*CENT. USMAI)	.129	.085	1.525	.133

• *Sobel test*	*Value*	*S.E*	*Z*	*Sig.*
Indirect effect "ab"	.225	.068	3.326	.000

• *Bootstrapping*	*Mean*	*S.E*	*LL 95 CI*	*UL 95 CI*
Indirect effect "ab"	.232	.085	.092	.421

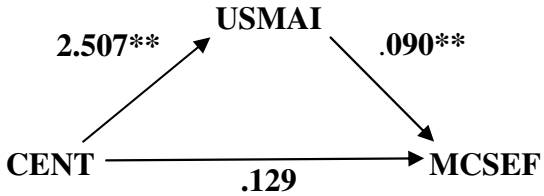
Figure 7.3 The Role of USMAI on the Relationship between CENT and MCSEFC

Panel A: The Total Effect



** Significant at the level of .001

Panel B: The Mediating Effect



** Significant at the level of .001

From the above results, it can be stated that the criteria of a *full mediation* effect are met. In other words, the usefulness of MAI has *a full mediation* effect on the relationship between centralisation and the effectiveness of MCS (Z= 3.326, $p <$ .001). Therefore, the research hypothesis (***H12***) is supported.

The overall mediation result found here seems to disagree with the finding by Teerooven and Bhagtaraj (2008) who reported only indirect effect of lower level of decentralisation on managerial performance through MAI. On the other hand, the significant relationship between centralisation and MAI usefulness (path *a*; $B = 2.507$, $p < .001$) suggest that companies with more delegated authorities may need to design MAS that provide relevant information to support managers in their planning, controlling and decision-making for which they are responsible. This finding is consistent with previous research (e.g. Chia, 1995, Abdel-Kader and Luther, 2008) who found a positive relationship between level of centralisation and MAS.

In general, the above findings suggest that MCS adopted in these relatively centralised companies tend to be more effective as managers rely more on MAI.

7.3.2 Formalisation (FORM)

H13 The usefulness of MAI has a mediating effect on the relationship between formalisation and the effectiveness of MCS.

The results of testing ***H13***, shown in Table 7.2 and Figure 7.4, indicate that all four paths are statistically significant at the .05 level. Specifically, the total effect of formalisation on MCS effectiveness is significant (MCSEFC*FORM; $c = .690$, $p <$ .001), and the indirect effect of formalisation on MCS effectiveness through the usefulness of MAI (i.e. ***ab***) is not zero with 95% confidence interval (.056 to .303, with a point estimate of .169), as are the paths from formalisation to MAI usefulness (USMAI*FORM; $a = 3.925$, $p < .001$), and MAI usefulness to MCS effectiveness while controlling for the effects of formalisation (MCSEFC*USMAI. FORM; $b =$ .043, $p = .016$), as well as the direct effect of formalisation on MCS effectiveness while controlling for MAI usefulness (MCSEFC*FORM. USMAI; $ć = .522$, $p <$ .001).

The previous results satisfy and confirm the *partial mediation* effect conditions. In short, the results supported the idea that the usefulness of MAI partially mediates the association between formalisation and MCS effectiveness (Z = 2.311, p = .021). Hence, ***H13*** is accepted.

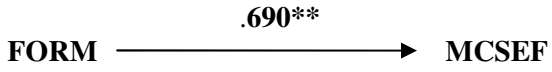
Table 7.2 Results of the Mediating Effect of USMAI on the Relation between FORM and MCSEFC

• *Causal steps approach*	*B*	*S.E*	*t*	*Sig.*
Path c (MCSEFC*FORM)	.690	.076	9.087	.000
Path a (USMAI*FORM)	3.925	.585	6.713	.000
Path b (MCSEFC*USMAI. FORM)	.043	.017	2.489	.016
Path ć (MCSEFC*FORM. USMAI)	.522	.099	5.280	.000
• *Sobel test*	*Value*	*S.E*	*Z*	*Sig.*
Indirect effect "ab"	.168	.073	2.311	.021

• *Bootstrapping*	*Mean*	*S.E*	*LL 95 CI*	*UL 95 CI*
Indirect effect "ab"	.169	.062	.056	.303

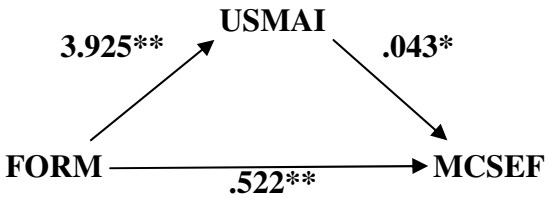
Figure 7.4 The Role of USMAI on the Relationship between FORM and MCSEFC

Panel A: The Total Effect



** Significant at the level of .001

Panel B: The Mediating Effect



* Significant at the level of .05
** Significant at the level of .001

The above results are similar to Nicolaou's (2000) findings, that the degree of formalisation, among other factors, influenced the effectiveness of MAS, and this relation was mediated by the MAS integration, although the intervening variable model was not explicitly acknowledged.

The findings also indicate the positive relationship between level of formalisation and MAI usefulness, as path ***a*** in Figure 7.4 is significant at the .05 level (B = 3.925, $p <$ .001). This means that these companies benefit from MAI when rules and control procedures are embedded within organisational routines and systems, therefore in such situations this may increase the need for relevant information to monitor companies' actions on an ongoing basis.

7.3.3 Environmental Uncertainty (ENUC)

H14 The usefulness of MAI has a mediating effect on the relationship between environmental uncertainty and the effectiveness of MCS.

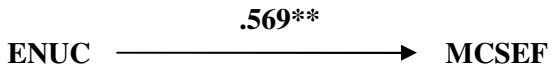
As shown in Table 7.3 and Figure 7.5, the statistical results related to hypothesis ***H14*** indicate that the total relationship between environmental uncertainty and MCS effectiveness is statistically significant at the .05 level. (MCSEFC*ENUC; c = .569, p < .001). In addition, the indirect effect of environmental uncertainty on MCS effectiveness through the usefulness of MAI (i.e. ***ab***) is different from zero with 95% confidence interval (.115 to .467, with a point estimate of .274), as is the path from environmental uncertainty to MAI usefulness (USMAI*ENUC; a = 3.804, $p <$ .001), and the path from MAI usefulness to MCS effectiveness while controlling for environmental uncertainty (MCSEFC*USMAI. ENUC; b = .072, $p <$ .001). Also the direct effect of environmental uncertainty on MCS effectiveness, while controlling for MAI usefulness, is statistically significant at the .05 level (MCSEFC*ENUC. USMAI; $ć$ = .295, p = .012).

Table 7.3 Results of the Mediating Effect of USMAI on the Relation between ENUC and MCSEFC

• *Causal steps approach*	*B*	*S.E*	*t*	*Sig.*
Path c (MCSEFC*ENUC)	.569	.097	5.885	.000
Path a (USMAI*ENUC)	3.804	.623	6.112	.000
Path b (MCSEFC*USMAI. ENUC)	.072	.019	3.747	.000
Path ć (MCSEFC*ENUC. USMAI)	.295	.113	2.598	.012
• *Sobel test*	*Value*	*S.E*	*Z*	*Sig.*
Indirect effect "ab"	.275	.087	3.164	.002
• *Bootstrapping*	**Mean**	**S.E**	**LL 95 CI**	**UL 95 CI**
Indirect effect "ab"	.274	.090	.115	.467

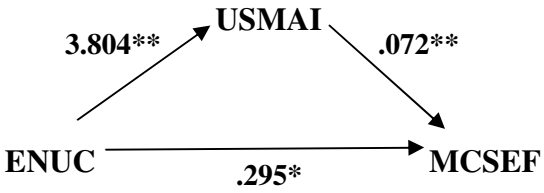
Figure 7.5 The Role of USMAI on the Relationship between ENUC and MCSEFC

Panel A: The Total Effect



** Significant at the level of .001

Panel B: The Mediating Effect



* Significant at the level of .05
** Significant at the level of .001

Based on the previous results, the conditions of full mediation are not all met, and this is due to the direct effect result which is different from zero (i.e. $p < .05$). Alternatively, the characteristics of *partial mediation* effect are demonstrated. In this

context, the usefulness of MAI partially mediates the effect of environmental uncertainty on the effectiveness of MCS (Z = 3.164, p = .002). Thus, the research hypothesis (***H14***) is accepted.

The above results are consistent with the findings of some studies conducted in developing countries (e.g. Mia, 1993, Chong and Chong, 1997, Mia and Clarke, 1999, Naranjo-Gil and Hartmann, 2007). For instance, Mia and Clarke (1999) found that increased market competition was associated with increased use of broad scope MAI which positively influenced the organisational performance. The study reported the mediation role of MAI on the relationship between market competition and performance.

However, these results appear contradictory with the findings of Teerooven and Bhagtaraj (2008), who reported that neither a direct relationship existed between task uncertainty and managerial performance nor indirectly via the availability of broad scope, timeliness and aggregation of MAI.

The findings also show that environmental uncertainty has a positive influence on MAI usefulness (path *a*; B = 3.804, $p < .001$). This result confirms early research findings (Gordon and Narayanan, 1984, Chenhall and Morris, 1986, Gul and Chia, 1994, Chong and Chong, 1997, e.g. Abdel-Kader and Luther, 2008), and suggests that under high levels of uncertainty, managers perceive MAI beneficial to reduce uncertainty by helping them to be able to make relatively accurate predictions to cope with the environment complexities.

7.3.4 Level of Manufacturing Process Complexity (MAPCX)

H15 The usefulness of MAI has a mediating effect on the relationship between level of manufacturing process complexity and the effectiveness of MCS.

The results obtained from testing ***H10*** indicate that no relationship exists between manufacturing process complexity and MCS effectiveness, and therefore, the important condition of establishing a mediation effect is violated. Consequently, the

current hypothesis is not supported, and further analysis is needed to look for a possible alternative effect (i.e. indirect effect).

The results related to testing hypothesis (***H15***), as shown in Table 7.4 and illustrated in Figure 7.6, indicate that there is no relationship (i.e. no total effect) between manufacturing complexity and MCS effectiveness (MCSEFC*MAPCX; c = .257, p > .05). Similarly, the direct effect of manufacturing complexity of MCS effectiveness, while controlling for MAI usefulness, is not significant at the .05 level (MCSEFC*MAPCX. USMAI; $ć$ = .076, p = .462). However, the indirect effect of complexity level on MCS effectiveness through MAI usefulness is not zero (i.e. statistically significant at p < .05) by 95% confidence interval (.006 to .383, with a point estimate of .180), as are the paths from manufacturing complexity to MAI usefulness (USMAI*MAPCX; a = 1.781, p = .04) and from MAI usefulness to MCS effectiveness while controlling for manufacturing complexity (MCSEFC*USMAI. MAPCX; b = .101, p > .05).

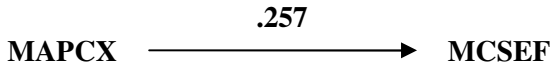
Table 7.4 Results of the Mediating Effect of USMAI on the Relation between MAPCX and MCSEFC

• ***Causal steps approach***	***B***	***S.E***	***t***	***Sig.***
Path c (MCSEFC*MAPCX)	.257	.130	1.973	.054
Path a (USMAI*MAPCX)	1.781	.846	2.106	.040
Path b (MCSEFC*USMAI. MAPCX)	.101	.016	6.244	.000
Path ć (MCSEFC*MAPCX. USMAI)	.076	.103	.741	.462
• ***Sobel test***	***Value***	***S.E***	***Z***	***Sig.***
Indirect effect "ab"	.180	.091	1.973	.049
• ***Bootstrapping***	***Mean***	***S.E***	***LL 95 CI***	***UL 95 CI***
Indirect effect "ab"	.180	.096	.006	.383

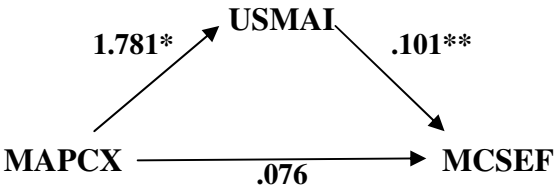
It can be noticed from the above results that one of the important conditions for a mediation relationship is violated (i.e. the total effect condition). Therefore, no full or partial mediation exists; thereby the indirect effect path is the only possible explanation of this relationship. In other words, the association between manufacturing complexity and MCS effectiveness only appears indirectly through MAI usefulness (Z = 1.973, p = .049).

Figure 7.6 The Role of USMAI on the Relationship between MAPCX and MCSEFC

Panel A: The Total Effect



Panel B: The Mediating Effect



* Significant at the level of .05
** Significant at the level of .001

Given that no total and direct effect was found, and the only effect of the independent variable on the dependent variable appears indirectly through the mediator, ***H15*** is rejected.

The above results are similar to those reported by Mia and Winata (2008) that the association between JIT application and managers' use of information and communication technology for decision-making appears only indirect through the their use of broad MAI. In addition, Baines and Langfield-Smith (2003) reported that changes in technology led to more use of non-financial MAI which in turn enhanced organisational performance.

The findings also show a positive significant relationship between manufacturing complexity and MAI usefulness (path *a*; B = 1.781, $p < .05$). This result supports previous empirical research findings (e.g. Chenhall and Langfield-Smith, 1998b, Baines and Langfield-Smith, 2003) and implies that when the levels of manufacturing

process complexity increases (or change), managers of these companies demand more MAI and perceived them useful for solving problems and controlling activities.

7.3.5 Competitive Strategy (CMSTG)

H16 The usefulness of MAI has a mediating effect on the relationship between competitive strategy and the effectiveness of MCS.

The statistical results related to testing hypothesis (***H16***), shown in Table 7.5 as well as in Figuer 7.7, confirm the total effect of competitive strategy on MCS effectiveness, which is significant at the level of 95% confidence (MCSEFC*CMSTG; c = .619, p < .001). Likewise, the indirect effect of competitive strategy on MCS effectiveness through MAI usefulness is different from zero at the same level of confidence interval (.119 to .531, with a point estimate of .301), as is the path from competitive strategy to MAI usefulness (USMAI*CMSTG; a = 4.075, p < .001), and the path from competitive strategy to MCS effectiveness while controlling for MAI usefulness (MCSEFC*USMAI. CMSTG; b = .072, p < .001). With respect to the direct effect from competitive strategy to MCS effectiveness while controlling for MAI usefulness, it is also found significant at the .05 level (MCSEFC*CMSTG. USMAI; $ć$ = .328, p = .009).

Table 7.5 Results of the Mediating Effect of USMAI on the Relation between CMSTG and MCSEFC

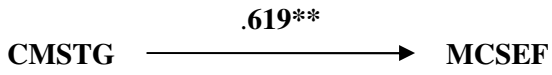
• *Causal steps approach*	*B*	*S.E*	*t*	*Sig.*
Path c (MCSEFC*CMSTG)	.619	.104	5.951	.000
Path a (USMAI*CMSTG)	4.075	.678	6.013	.000
Path b (MCSEFC*USMAI. CMSTG)	.072	.019	3.757	.000
Path ć (MCSEFC*CMSTG. USMAI)	.328	.121	2.708	.009
• *Sobel test*	*Value*	*S.E*	*Z*	*Sig.*
Indirect effect "ab"	.291	.092	3.155	.002

• *Bootstrapping*	*Mean*	*S.E*	*LL 95 CI*	*UL 95 CI*
Indirect effect "ab"	.301	.107	.119	.531

From the above findings, it can be noticed that the assumptions of full mediation have not all been fruitfully proved. However, these findings support the partial mediation effect of USMAI on the relationship between CMSTG and MCSEFC (Z = 3.155, p = .002). Therefore, the research hypothesis (***H16***) is accepted.

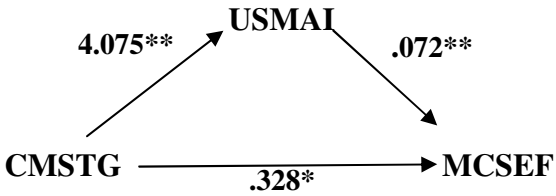
Figure 7.7 The Role of USMAI on the Relationship between CMSTG and MCSEFC

Panel A: The Total Effect



** Significant at the level of .001

Panel B: The Mediating Effect



* Significant at the level of .05
** Significant at the level of .001

These results are consistent with Chong and Chong's (1997) findings that competitive strategy is an important determinant of the use of MAI and this has a positive influence on business unit performance. Their study effectively covered the mediation role of MAI although this was explicitly analysed.

This study findings are also similar to those of Baines and Langfield-Smith (2003) who reported that a change in emphasis toward differentiation strategy accompanied more reliance on broad scope MAI which had a positive influence on organisational performance. However, the results disagree with Hoque's (2004) findings, who

concluded that the association between strategic priorities and performance appears only indirect through the use of several non-financial indicators.

In addition, the positive relationship found between competitive strategy and MAI usefulness (path *a*; B = 4.075, p < .001) means that these companies recognise the vital role of MAI to support their particular strategic priorities. Similar conclusions were reported in previous management accounting research (e.g. Hoque, 2004, Naranjo-Gil and Hartmann, 2006)

7.4 Individual Mediating Effect of MAI Dimensions

The preceding section has addressed the mediating effect of MAI usefulness on the relationship between contingent variables and MCS effectiveness on an aggregate level. As the mediator variable (i.e. MAI usefulness) measurement was derived from four dimensions of MAI characteristics including, scope, timeliness, aggregation, and integration, it is possible to detect the mediating effect that each dimension exerts on the relationship between organisational variables and the effectiveness of MCS, and therefore discover from which dimension(s) the aggregate mediation or indirect effect is driven. Thus, this section aims to shed light on the individual intervening effect of the four mentioned dimensions. Table 7.6 presents the results of running Preacher and Hayes' (2004) macro.

7.4.1 Centralisation

As demonstrated in the previous section, the total effect of centralisation on MCS effectiveness was found significant at the .05 level (see path ***c*** in Table 7.1). Results shown in Table 7.6 indicate that the usefulness of all four dimensions of MAI had a mediating effect on the relationship between centralisation and MCS effectiveness (see paths ***a***, ***b***, and ***ć***). However, the aggregation dimension is the only one that accounts for full (complete) mediating role whereas the other three dimensions partially mediated the relationship. To illustrate this, the indirect effect of centralisation on MCS effectiveness through usefulness of scope, timeliness, and integration dimensions (***ab***s) is different from zero by 95% confidence interval based on 5000 bootstrap samples (ranged from .0426 to .3734), as are paths: (i) from

centralisation to scope (path *a*; *B* = 2.229, p < .001), timeliness (path *a*; *B* = 2.837, p < .001), and integration (path *a*; *B* = 2.097, p < .01); (ii) from scope (path *b*; *B* = .068, p < .001), timeliness (path *b*; *B* = .062, p < .001), and integration (path *b*; *B* = .071, p < .001) to MCS effectiveness while controlling for the effects of centralisation, and (iii) the direct effect of centralisation on MCS effectiveness while controlling for scope (path *ć*; *B* = .203, p < .05), timeliness (path *ć*; *B* = .177, p < .05), and integration (path *ć*; *B* = .205, p < .05). In sum, due to the significance of all four paths for the three dimensions, the mediating effect found here is classified as partial mediation. Therefore, the usefulness of scope (Z = 2.624, p < .01), timeliness (Z = 2.847, p < .01), and integration (Z = 2.601, p < .01) partially mediated the relationship between centralisation and MCS effectiveness.

On the other hand, the indirect effect of centralisation on MCS effectiveness through aggregation dimension is not zero at the .05 level (*ab*; *B* = .199, p < .01), as are paths from centralisation to aggregation usefulness (path *a*; B = 2.849, p < .001), and from aggregation to MCS effectiveness (path *b*; B = .070, p < .001). In contrast, the direct effect of centralisation on MCS effectiveness while controlling for aggregating usefulness is not significantly different from zero by 95% confidence interval (path *ć*; B = .155, p > .05). In short, given the significant result of the first three paths (***c, a, b***), and insignificant for path ***ć***, aggregation dimension is found to play a full mediating role on the relationship between centralisation and MCS effectiveness (Z = 3.012, p < .01). Therefore, the aggregate full mediation of MAI usefulness found in the previous section seems to be driven by the usefulness of aggregation dimension.

The findings related to the mediating role of all four MAI dimensions reported in this study is consistent with the findings reported by Teerooven and Bhagtaraj (2008). However, their study did not classify the mediating effect of MAI dimensions into either full or partial form of effect. On the other hand, the positive relationship was found between centralisation and each of the four MAI dimensions (see path ***a*** for each dimension in Table 7.6) means that when decision making authorities are delegated to lower levels, managers in these relatively low centralised companies (mean = 2.87 out of 5.00) rely more and benefit from scope, timeliness, aggregated, and integrated information within their area of responsibility. These findings are

similar to those found by Teerooven and Bhagtaraj (2008) in another developing country, namely Mauritius. However, findings from a more mature economy such as Australia suggest that low level of centralisation is positively related to aggregation and integration dimensions (Chenhall and Morris, 1986).

7.4.2 Formalisation

The formalisation variable was also found to have a positive influence on MCS effectiveness (i.e. the total effect was significant at the .05 level). The mediation regression results shown in Table 7.6 indicate that only two dimensions contributed to the aggregate partial mediating role of MAI usefulness established in this chapter. Specifically, as can be seen from Table 7.6, the indirect effect of formalisation on MCS effectiveness via scope and integration usefulness (***ab***s) is different from zero by 95% confidence interval based on 5000 bootstrap samples (ranged from .0334 to .2502), as are paths from formalisation to scope (path *a*; $B = 3.162$, $p < .001$), and integration (path *a*; $B = 3.511$, $p < .001$); from scope (path *b*; $B = .039$, $p < .01$) and integration (path *b*; $B = .037$, $p < .05$) to MCS effectiveness while controlling for the effects of formalisation; and finally the direct effect of formalisation on MCS effectiveness while controlling for scope (path *ć*; $B = .568$, $p < .001$), and integration (path *ć*; $B = .562$, $p < .001$). This is, however, was not the case for timeliness and aggregation dimensions due to the insignificant relationship between them and MCS effectiveness when formalisation effect is controlled (see path ***b*** for each dimension) and the only effect that could be observed here is the total effect. The absence of these relationships could imply that aggregated and timely information are irrelevant to the effective design and use of an MCS in the presence and controlling for the effect of formalisation variable.

Therefore, based on the above results, scope and integration usefulness have a partial mediating role on the relationship between formalisation and MCS effectiveness ($z = 2.361, 2.248$; $p < .05$ respectively), and the aggregated partial mediation effect of MAI usefulness on the relationship between formalisation and MCS effectiveness is driven by these two dimensions. These findings imply that as the degree of formalisation increases in these companies, managers benefit more from external,

nonfinancial future oriented, and coordination information in order to enhance their MCS.

The significant relationship that exists between formalisation and all four dimensions (see path ***a*** for each dimension) means that when rules, procedures, and routines are emphasised in these companies, managers tend to demand broad scope, timely, aggregated, and integrated information to meet the desired targets. However, the literature review in Chapter Three did not find any study based on contingency theory examining the relationship between MAI characteristics and formalisation.

7.4.3 Environmental Uncertainty

Simple regression test revealed the total effect of environmental uncertainty on MCS effectiveness (path ***c*** in Table 7.3). The mediation regression results shown in Table 7.6 indicate that all four MAI dimensions partially mediated the relationship between environmental uncertainty and MCS effectiveness. As can be seen, the indirect effect of this contingent variable on the effectiveness of MCS through scope, timeliness, aggregation, and integration dimensions is not zero at the .05 level (bootstrapping ranged from .0441 to .04003), as are paths: (i) from environmental uncertainty to scope (path *a*; $B = 4.066$, $p < .001$), timeliness (path *a*; $B = 3.674$, $p < .001$), aggregation (path *a*; $B = 4.140$, $p < .001$), and integration (path *a*; $B = 3.035$, $p < .001$); (ii) from scope (path *b*; $B = .047$, $p < .05$), timeliness (path *b*; $B = .049$, $p < .01$), aggregation (path *b*; $B = .052$, $p < .01$), and integration (path *b*; $B = .058$, $p < .001$) to MCS effectiveness while controlling for environmental uncertainty effect; and (iii) from environmental uncertainty to MCS effectiveness with the presence and controlling for the effects of scope (path *ć*; $B = .377$, $p < .01$), timeliness (path *ć*; $B = .386$, $p < .001$), aggregation (path *ć*; $B = .354$, $p < .01$), and integration (path *ć*; $B = .392$, $p < .001$).

The above findings suggest that the usefulness of scope, timeliness, aggregation, and integration have a partial mediating effect on the relationship between environmental uncertainty and MCS effectiveness ($Z = 2.272, 2.653, 2.567, 2.670$; $p < .05$ respectively). Hence, the aggregated mediating effect of MAI usefulness on the relationship between environmental uncertainty and MCS effectiveness was driven by

all four MAI dimensions. One possible explanation is that when managers of large manufacturing companies operating in Libya are faced with uncertain situations they find all MAI dimensions useful to predict and estimate the outcome of their decisions and how this would influence the organisational MCS and performance. These findings disagree with Teerooven and Bhagtaraj's (2008) results who found no mediating role of all dimensions on the relationship between task uncertainty and managerial performance, although task uncertainty is the narrower concept of environmental uncertainty.

Given that scope of MAI was the most widely investigated dimension in the management accounting contingency theory based research (see Chapter Three, Table 3.3), empirical evidence on the mediator variable in the case of environmental uncertainty is limited to this dimension. The findings are consistent with previous studies by Mia (1993) and Chong and Chong (1997) who reported the mediating role of scope of MAI on the relationship between environmental uncertainty and organisational as well as managerial performance. Moreover, Mia and Clarke (1999) found support for the mediating role of the use of scope information on the relation between intensity of market competition and business unit performance. However, none of the mediation forms (i.e. full or partial) was acknowledged in these studies.

With respect to the significant relationship between environmental uncertainty and all MAI dimensions (path *a* for each dimension), two findings were consistent with Chenhall and Morris (1986) results who reported a positive association between environmental uncertainty and scope as well as timeliness dimensions, but not for aggregation and integration dimensions.

The findings also confirm earlier studies by Gul and Chia (1994) and Abdel-Kader and Luther (2008) who addressed the impact of environmental uncertainty on the level of MAPs sophistication (i.e. the provision of relevant and comprehensive information). In general, these findings indicate that as decision makers of large manufacturing companies in Libya perceive high environmental uncertainty, they tend to demand external, non-financial and future-oriented information in addition to other types of information.

Table 7.6 Results of Mediating Effect of All Four MAI Dimensions

Organisational Variables	MAI dimensions (Mediator)	Path a		Path b		Path ć		Sobel test "ab"		Bootstrapping ab 95% CI		Comment	Aggregate effect
		B	t	B	t	B	t	B	Z	LL	UL		
Centralisation	*Scope*	2.229	3.569***	.068	4.021***	.203	2.401*	.151	2.624**	.0463	.3102	PM	FM
	Timeliness	2.837	4.212***	.062	3.970***	.177	2.017*	.176	2.847**	.0614	.3691	PM	
	Aggregation	2.849	4.736***	.070	3.988***	.155	1.705	.199	3.012**	.0726	.3734	FM	
	Integration	2.097	3.322**	.071	4.365***	.205	2.504*	.149	2.601**	.0426	.3378	PM	
Formalisation	*Scope*	3.162	4.287***	.039	2.905**	.568	6.866***	.123	2.361*	.0334	.2295	PM	PM
	Timeliness	4.829	7.013***	.017	1.104	.609	5.758***	.081	1.080	-.0401	.2375	TE	
	Aggregation	4.341	6.689***	.024	1.491	.586	5.726***	.104	1.440	-.0207	.2494	TE	
	Integration	3.511	4.990***	.037	2.567*	.562	6.403***	.128	2.248*	.0438	.2502	PM	
Environmental uncertainty	*Scope*	4.066	6.059***	.047	2.484*	.377	3.127**	.192	2.272*	.0441	.4003	PM	PM
	Timeliness	3.674	4.382***	.049	3.418**	.386	3.747***	.183	2.653**	.0585	.3466	PM	
	Aggregation	4.140	5.927***	.052	2.888**	.354	3.024**	.215	2.567*	.0623	.3457	PM	
	Integration	3.035	3.963***	.058	3.727***	.392	3.967***	.177	2.670**	.0525	.3566	PM	
Level of manufacturing process complexity	*Scope*	1.569	1.704	.081	5.035***	.129	1.169	.128	1.586	-.0279	.3312	None	IE
	Timeliness	1.439	1.384	.074	5.299***	.149	1.391	.107	1.317	-.0669	.3258	None	
	Aggregation	2.054	2.200*	.083	5.285***	.086	.783	.170	2.001*	.0199	.3549	IE	
	Integration	2.028	2.251*	.085	5.171***	.085	.762	.172	2.033*	.0152	.3790	IE	
Competitive strategy	*Scope*	4.004	5.213***	.049	2.808**	.421	3.487**	.198	2.437*	.0431	.4544	PM	PM
	Timeliness	4.539	5.315***	.046	2.943**	.409	3.385**	.210	2.540*	.0689	.4199	PM	
	Aggregation	4.216	5.381***	.053	3.086**	.397	3.300**	.222	2.643**	.0885	.3805	PM	
	Integration	3.521	4.352***	.056	3.488***	.421	3.813***	.199	2.679**	.0620	.3851	PM	

*CI: confidence interval; LL: lower level; UL: upper level; FM: full (complete); PM: partial mediation; IE: indirect effect; * p <.05; ** p <.01 *** p <.001.*

7.4.4 Level of Manufacturing Process Complexity

As mentioned in subsection 7.3.4, the insignificant influence of the level of manufacturing process complexity on MCS effectiveness rules out the mediating role of MAI usefulness. In this case, the aggregate indirect effect of MAI usefulness was detected and confirmed. Table 7.6 presents the indirect effect results of the four dimensions individually. It can be seen from this table that manufacturing complexity influences MCS effectiveness only through two dimensions, namely aggregation and integration. This is due to the insignificant relationship between the contingent variable and scope as well as timeliness of MAI (i.e. path *a* not significant for both dimensions). Thus, the aggregate indirect effect of MAI usefulness was derived from (or transmitted by) aggregation and integration of MAI.

Specifically, the level of manufacturing process complexity affects the aggregation dimension (path *a*: B = 2.054, $p < .05$), and in turn the aggregation dimension affects MCS effectiveness (path *b*: B = .083, $p < .001$). Similarly, manufacturing process complexity affects the integration dimension and (path *a*: B = 2.028, $p < .05$), and in turn the integration dimension affects MCS effectiveness (path *b*: B = .085, $p < .001$). These results suggest that MAI provided in different forms of aggregation and on various units' interaction (coordination) are more relevant to the MCS effectiveness as the manufacturing process gets more complex. Baines and Langfield-Smith (2003) concluded that change in manufacturing technology positively influenced the reliance on non-financial MAI which in turn led to improvement in organisational performance.

7.4.5 Competitive Strategy

The findings related to competitive strategy are similar to environmental uncertainty results. In other words, all four MAI dimensions were found to have a mediating role on the relationship between competitive strategy and MCS effectiveness. Table 7.6 presents the mediation regression results of each dimension.

The results indicate that the indirect effect of competitive strategy on MCS effectiveness through all four dimensions (***ab***s) is different from zero at the .05 level

based on 5000 bootstrap samples (ranged from .0431 to .4544), as are paths: (i) from competitive strategy to usefulness of scope (path *a*; *B* = 4.004, p < .001), timeliness (path *a*; *B* = 4.539, p < .001), aggregation (path *a*; *B* = 4.216, p < .001), and integration (path *a*; *B* = 3.521, p < .001); (ii) from scope (path *b*; *B* = .049, p < .01), timeliness (path *b*; *B* = .046, p < .01), aggregation (path *b*; *B* = .053, p < .01), and integration (path *b*; *B* = .056, p < .001) to MCS effectiveness with the presence and controlling for competitive strategy effect; and (iii) from competitive strategy to MCS effectiveness while controlling for the effect of scope (path *ć*; *B* = .421, p < .01), timeliness (path *ć*; *B* = .409, p < .01), aggregation (path *ć*; *B* = .397, p < .01), and integration usefulness (path *ć*; *B* = .421, p < .001). Therefore, the overall partial mediating role of MAI usefulness found earlier seems to be driven by the usefulness of scope (Z = 2.437, p <.05), timeliness (Z = 2.540, p <.05), aggregation (Z = 2.643, p <.01), and integration dimensions (Z = 2.679, p <.01).

Again, empirical evidence from contingency theory-based studies in relation to the mediating role of MAI dimensions is available only on scope dimension (see Chapter Three, Table 3.3). Chong and Chong (1997) found that the use of scope information mediated the relationship between business unit strategy and its performance, although the form of the mediating role was not identified as in this study.

The significant relationship between competitive strategy and scope, timeliness, aggregation, and integration (path ***a*** for each dimension) means that as these companies put more emphasis on different strategic priorities to attain and sustain a competitive position in the market place, all dimensions of MAI will certainly be perceived helpful to achieve the desired activities. Previous studies (e.g. Govindarajan, 1988, Chenhall and Langfield-Smith, 1998c, Abernethy and Brownell, 1999) supported the strong relationship between competitive strategy and different aspects of MAPs, the provider of relevant information.

7.5 Summary and Conclusion

This chapter has presented the findings from testing the third group of research hypotheses, which is concerned with the potential mediating effect of MAI usefulness on the relationship between the selected contingency variables and MCS effectiveness. Except manufacturing process complexity variable, usefulness of MAI was found to play a mediating role on the relationship between organisational variables, including centralisation, formalisation, environmental uncertainty and competitive strategy, and MCS effectiveness. Specifically, this mediating effect was full (complete) for the centralisation variable relationship and was partial for the other three variables' relationships.

By interrogating the data to identify the real driver(s) of the aggregate mediating role of MAI usefulness, the results revealed that the full mediating role of MAI in the centralisation variable was driven by the aggregation dimension, whereas the partial role in the case of the environmental uncertainty and competitive strategy variables was derived from all four dimensions. In contrast, the aggregate partial mediating role of MAI usefulness in the formalisation variable was driven by the scope and integration dimensions only. On the other hand, manufacturing process complexity was found to have an indirect effect on MCS effectiveness through MAI usefulness and that was driven by the aggregation and integration dimensions.

Based on the available relevant literature, a discussion of each finding was provided for the results of this aforementioned group of hypotheses. A summary and further discussion of the research findings emerged from the data analysis and their implications for theory as well as practice are presented in the next chapter.

Chapter Eight
Conclusions

8.1 Introduction

The overall aim of this study was to attempt a detailed and comprehensive view of the factors that affect the design and use of effective MCS. A particular emphasis was placed on the role of MAI in facilitating these systems in manufacturing companies in Libya, where the research effort has so far been limited to examining MAPs. As stated in Chapter One and informed by the extensive review of the relevant literature (see Chapters Two and Three) the specific objectives of this research were as follows:

1. To examine the strategy formulation process in large manufacturing companies in Libya, and the role of MAI in this process.
2. To identify the perceived usefulness of MAI in these companies.
3. To identify the types of MCS, their relationship with competitive strategy and effectiveness in these companies.
4. To examine the relationship between contingent variables and the effectiveness of MCS, and the role of MAI usefulness in these relationships.

In trying to provide a better understanding of MCS in line with these objectives, this research study has adopted a contingency theory approach to investigate the relationship between a set of contingent variables - namely centralisation, formalisation, environmental uncertainty, level of manufacturing process complexity and competitive strategy - and MCS effectiveness, and then, as depicted in the research framework in Chapter One, ascertain the role of MAI in these relationships. The rationale for selecting these contingent variables was twofold. The concept of fit is central to contingency theory and the thorough review of the extant literature undertaken for this research study clearly indicates that the above variables are critical when applying this concept for examining MCS within their complex organisational settings. Consequently, in order to be able to arrive at a better and more informative

understanding of these complex relationships in an emerging economy context, the interplay between these contingent variables requires serious consideration.

More specifically, this research study combined two forms of contingency fit (i.e. the selection fit and the interaction fit) to investigate cause-effect relationships between organisational variables, MAI usefulness and MCS effectiveness. The adoption of these two approaches in this way was inspired by the perceptive recommendations made by a number of scholars of the contingency approach (e.g. Drazin and Van De Ven, 1985, Hall, 2011) that by combining the two forms it is more likely to obtain a richer set of results and enhance the understanding of the relationship among organisational variables and effective MCS design compared to what single approach studies have been able to achieve. This study, therefore, used a selection fit approach to examine the initial relationship between contingent variables and MCS effectiveness without testing the role of MAI usefulness on this causal sequence relationship. This was to identify the possible influence that each organisational variable might have on MCS effectiveness. The analysis was then augmented with the interaction fit approach to recognise whether the initial influence of the organisational variables on MCS effectiveness remained constant or not when the effect of MAI usefulness was introduced.

As mentioned in Chapter Two (Section 2.5), there are two predominant models for depicting the interaction fit approach, the *moderation* model and the *mediation* model. The underpinning assumption of the moderation model is the independence between contingent variables (e.g. strategy) and the moderator (e.g. MAI in this case). This assumption, however, is questionable due to the theoretical relationship between contingency variables and MAI usefulness. Consequently, the mediation model has been used in this study as it assumes that the contingent variables and MAI (as a mediator) are theoretically related and was thought to be more consistent with the objectives of the study than the moderation model. In addition, the mediating effect in this study is classified into full (or complete) effect and partial effect. Full mediation is established if the contingency variable(s) no longer directly contribute to the prediction of MCS effectiveness when the mediator is introduced, whereas the partial mediation is recognised if the contingent variable(s) continue to directly contribute to

the prediction of MCS effectiveness even with the introduction of MAI usefulness. On the other hand, when the mediating effect is not demonstrated, i.e. the initial relationship does not exist, a third intervening scenario emerges and this can simply be called the indirect effect. Thus, by having been able to distinguish between mediated and indirect effects, this study overcomes a deficiency in the management accounting literature where these two forms of interaction have been mistakenly treated as synonymous when in fact they are very different in the way they should be analysed and interpreted.

A survey questionnaire was developed and administered to collect primary data for meeting the research objectives through testing the three groups of hypotheses that were formulated for this study (see Chapter Four). Five-point Likert scales were built into the questionnaire to capture detailed information on the contingent variables described above as well as MAI and MCS in the target companies. For the purpose of analysis, the study used **a)** descriptive statistics (e.g. percentage and mean scores, see Chapter Five) for analysing some of the data related to the first three research objectives; **b)** advanced statistical techniques (e.g. independent t-test, simple and multiple regression) to test hypotheses related to the first three research objectives as well as the first part of the fourth objective (see Chapter Six), and **c)** mediation regression for analysing the data related to the second part of the fourth research objective (see Chapter Seven).

The next section summarises and discusses the main findings emerging from the descriptive statistics and inferential statistical analysis, followed by the study's contributions. The final section outlines the research limitations and makes suggestions for future research.

8.2 Summary and Discussions of the Research Findings

This section gives an overview of the main findings that were presented in Chapters Five, Six and Seven, with an overall discussion in relation to the research objectives and questions. Sub-section 8.2.1 summarises the results from the descriptive analysis, whereas sub-sections 8.2.2-8.2.4 summarise the results of the hypotheses tests. As explained below, the present study has produced sufficient information and interesting

results in relation to the study's objectives and questions, supporting 11 out of 16 hypotheses and offering good avenues for future research in an area that is both theoretically and practically important.

8.2.1 Findings of Descriptive Statistical Analysis

In relation to the **first research objective** (i.e. *to examine the strategy formulation process in large manufacturing companies in Libya, and the role of MAI in this process*) and the related **research questions 1-3** about how strategies are formulated and what role MAI plays in this respect, this study has yielded the following results:

- Senior managers seem to exert a lot of authority and they are the people most involved in strategy formulation at all levels. On the other hand, middle managers participated more in shaping competitive and operational level strategies, whereas operational managers' role in this process is still relatively low and restricted to the operational level strategy. This is consistent with the moderate level of authority delegation in the sampled companies (mean = 2.87).

- The surveyed companies adopt, to a moderate extent, formal and systematic procedures in the strategy formulation process (overall mean score of 3.50), but this could be explored more as follows:

    - The priority is for customer satisfaction, attaining and sustaining competitive advantage, and identifying and evaluating the relevant internal activities and actions to formulate achievable strategy.

    - The formulation process ensures a degree of adaptability and flexibility of company strategy to respond to emerging opportunities as well as threats. However, the utilisation of advanced strategic thinking models (e.g. SWOT) in supporting the formulation process is relatively low.

- The surveyed companies place different degrees of emphasis on cost leadership and product differentiation priorities in order to attain and sustain a competitive position. The finding here is consistent with the argument advanced by Porter (1980), Govindarajan (1988) and Langfield-Smith (2007) that companies pursuing cost leadership strategy tend to emphasise more on cost leadership priorities but

less on product differentiation priorities, whereas companies following product differentiation priorities do not totally ignore cost leadership activities.

- The surveyed companies perceive MAI important to the activities of both strategic priorities. These findings confirm the essential role of MAI, reported in previous research (e.g. Chenhall and Morris, 1995, Naranjo-Gil and Hartmann, 2006), in formulating and implementing strategic activities regardless of strategic priority being pursued. However, MAI is seen to be more relevant to cost leadership than product differentiation priorities, as traditional MAPs (e.g. variable costing, budgeting systems) are emphasised more in these companies (Leftesi, 2008).

With regard to the **second research objective** (*to identify the perceived usefulness of MAI in these companies*) and related **research question four** about how managers perceive MAI usefulness, the results revealed that:

- The surveyed companies attach considerable importance (mean score of 4.17) to all four dimensions of MAI (i.e. scope, timeliness, aggregation, and integration) to aid managers in planning, control and problem solving activities, which is consistent with most previous studies (e.g. Chenhall and Morris, 1986, Mia, 1993, Chong and Chong, 1997, Mia and Clarke, 1999, Bouwens and Abernethy, 2000, Naranjo-Gil and Hartmann, 2007). In addition, the aggregated information was found the most important information among other dimensions, and this is possibly due to high level of interdependence and cooperation between different areas in these companies. Similarly, in relation to information timeliness, the high importance attached to the provision of frequently relevant information on a systematic and regular basis (mean = 4.44) could be explained through the level of formalisation (mean = 3.78) employed in these companies.

- The availability of four MAI dimensions in the surveyed companies is moderate to some extent (mean = 3.33). Again, the aggregated information is relatively available compared to the other three dimensions, and this could be linked to the significant importance attached to this dimension by these companies. In addition, the degree of formalisation practised in these companies has a positive influence

on the availability of information on a systematic regular basis (mean = 3.81). In contrast, the low level of adoption of advanced MAPs and the greater reliance on traditional techniques in the Libyan companies (e.g. Abulghasim, 2006, Leftesi, 2008) may explain the lack of providing such information.

- The surveyed companies perceive, to some extent, all four dimensions of MAI to be beneficial in planning, control and problem solving activities (overall mean score of 14.41, out of 25) and this is similar to the findings reported by Chenhall and Morris (1986), and Bouwens and Abernethy (2000).

In addition to the abovementioned results, the following indicators provide a strong insight to the state of MAI provision in large manufacturing companies in Libya

- The mismatch between the ranking of importance of scope dimension (ranked 3) and its availability rank (ranked 4) has negatively reflected its usefulness in these companies.

- The availability of non-financial, external, and future oriented information is insufficient (based on their importance) and probably do not meet the managers' needs.

Therefore, the difference in importance and availability ranking attached to the scope of MAI indicates that there is a lack of providing relevant information by the MAS in large manufacturing companies in Libya. This could be explained through the low adoption of advanced MAPs, and heavily reliance on traditional MAPs as they are main provider of relevant information. Specifically, most of the responding companies (52%) are State-owned companies, where the economic activities, usage of accounting information, and some critical decision were monopolised by the previous regime is a possible explanation for the restriction to the traditional MAPs (Leftesi, 2008).

In respect of the **third research objective** (*to identify the types of MCS, their relationship with competitive strategy and effectiveness in these companies*) and

related **research question five** about what MCS companies use, the results show that these companies

- Adopt more bureaucratic MCS (overall mean score of 3.49 out of 5). This result could be explained as follows:
    - Formal, impersonal, and tight controls are the most popular types adopted by the sampled companies to motivate, control, and direct activities. Specifically, companies place greater emphasis on the formal reports related to the achievement of targets (a mean score of 4.21), hence the moderate reliance on action control.
    - Restricted control is however less popular (a mean value of 2.72), indicating that managers in these companies have, to some extent, a degree of discretion in making decisions and responding to new opportunities or challenges. This confirms the reported moderate level of centralisation (a mean of 2.87).
- Recognise the importance of several key factors (e.g. management commitment, MAI) in the successful design of MCS.
- In their majority (88.9%) utilise a combination of financial and non-financial indicators to assess their MCS, noting that there is more reliance on financial indicators (e.g. operating profits, profit to sales ratio) to evaluate MCS and organisational success.
- Use external indicators, in addition to internal indicators, to evaluate their MCS and organisational success. Comparison with direct competitors is the dominant external indicator, as 51.8% of the companies apply this indicator for assessing their company's MCS effectiveness and success.

8.2.2 Findings Related to the Characteristics of Cost Leaders and Differentiators

The previous sub-section has presented an overall view of several aspects in relation to MCS types, strategy formulation process, and the role of MAI. This sub-section covers the first **three research objectives** (see Chapter 4, Section 4.2) and the related first **five research questions** (see Chapter 4, Section 4.3). The independent t-test (see Chapter 6) was utilised to test the differences between cost leader and differentiator

companies, and simple regression as well as correlation analysis were used to provide additional insight to particular associations. An overall summary of the related research hypotheses tests is presented in Table 8.1.

The absence of any significant difference between cost leaders and differentiators in the strategy formulation process (i.e. ***research objective 1, research question 1, hypothesis 1***) implies that both types of companies follow formal systematic procedures in formulating strategies. This may be due to the involvement of the government in controlling and supervising in most circumstances (as more than half of them are State-owned), where managers' response and decisions are limited to certain levels and require full permissions from the higher levels to take actions. Although the results indicate that large manufacturing companies in Libya have followed formal and systematic procedures to formulate their strategies, this level of procedures is relatively lower than the standards and procedures followed in developed countries, and this could be noticed from the slight use of strategic thinking methods (e.g. SWOT, VCA) to support the formulation process (mean = 2.98).

No significant difference exists between cost leader and differentiator companies in relation to the usefulness of MAI (i.e. ***research objective 2, research question 4, hypothesis 4***) which indicates that both of them perceive MAI to be useful for planning, controlling and problem solving activities. This finding is consistent with those reported by Abdel-Kader and Luther (2008) and Naranjo-Gil and Hartmann (2006) that MAI was perceived useful by both types of companies. Although the statistical analysis revealed no significant difference between the two types of company, differentiators tend to place greater emphasis on the usefulness of timeliness and aggregated information to support their MCS more than cost leaders (see Chapter Six, Table 6.4). In addition, MAI seems to play an important role in cost leadership and product differentiation priorities (see *rho* in Table 8.1; ***research objective 1, research questions 2-3, hypotheses 2-3***). However, this role is more likely to be relevant to cost leadership activities. The popularity of traditional MAPs (e.g. product costing systems), and the lower adoption rate of advanced practices among the manufacturing companies operating in Libya concluded in previous studies (e.g. Abulghasim, 2006, Alkizza, 2006, Leftesi, 2008), provide a potential explanation

to this relevance. In general, these findings support the notion that information provided by MAS is critical for decision makers to achieve and sustain a competitive advantage in the market place of their companies (e.g. Porter, 1980, Dent, 1990, Simons, 1990, Anthony and Govindarajan, 2007, Langfield-Smith, 2007).

Table 8.1 Summary of Hypotheses Tests Related to the Characteristics of Cost Leaders and Differentiators

Hypotheses	***t***	***Sig.***	***Comment***
H1 There is significant difference between cost leaders and differentiators in the strategy formulation process.	-.499	.620	Rejected
H4 There is significant difference between cost leaders and differentiators in the usefulness of MAI.	-.355	.724	Rejected
H6 There is significant difference between cost leaders and differentiators in the adoption of MCS types.	.012	.991	Rejected
	rho	***Sig.***	***Comment***
H2 MAI plays an important role in cost leadership priorities.	.480	.000	Accepted
H3 MAI plays an important role in differentiation priorities.	.410	.002	Accepted
	R^2	***Sig.***	***Comment***
H5 Competitive strategy influences the adoption of MCS types.	.588	.000	Accepted

The findings summarised in Table 8.1 also indicate that no significant difference was found between companies that emphasised more on cost leadership priorities and those that emphasised more on product differentiation priorities in relation to the adoption of MCS types (i.e. ***research objective 3, research question 5, hypothesis 6***). Large manufacturing companies in Libya seem to rely more on bureaucratic MCS (i.e. formal, tight, action, restricted, and impersonal controls) in motivating, monitoring, controlling and directing their activities. These findings seem to partially contradict with those reported by most previous research (e.g. Bruggeman and Van der Stede, 1993, Jermias and Gani, 2004, Auzair and Langfield-Smith, 2005) that differentiators were in favour of less bureaucratic MCS compared to their counterparts, the cost leaders who emphasised more bureaucratic controls. However, the finding related to budget targets commitment (tight control) is consistent with those of Bruggeman and Van der Stede (1993) that strict adherence to budget targets was important regardless

of the pursued competitive strategy. One possible explanation for these results could be the power that the government have had in directing these companies and to the level of structure employed in these companies (i.e. centralisation = 2.87 and formalisation = 3.78).

Additionally, the results show that the competitive strategy of large manufacturing companies in Libya positively influences the adopted and used MCS types (i.e. ***research objective 3, research question 5, hypothesis 5***), with 58.8% of the variance of MCS types could be explained by competitive strategy. These results support the strong argument raised in previous research (e.g. Chenhall, 2007, Langfield-Smith, 2007) that there is a close link between competitive strategy and the adoption/design of MCS, whereby these systems existed and expected to assist managers in formulating strategy and later be implicated in the strategy implementation and monitoring process, providing learning feedback and/or information for reformulating the strategies.

8.2.3 Findings Related to the Influence of Organisational Variables on MCS Effectiveness

The previous sub-section has shown the differences between companies that have placed more emphasis on cost leadership and those that emphasised more on product differentiation priorities in relation to different aspects. Based on an extensive review of the available relevant literature, a theoretical model was developed in this study to identify and understand the potential influence of the selected contingent variables on the MCS effectiveness. These variables, which include two aspects of organisational structure, namely centralisation and formalisation, environmental uncertainty, level of manufacturing process complexity, and competitive strategy, were formulated as ***hypotheses 7-11*** and tested utilising simple regression as can be seen from the results summary shown in Table 8.2. These relationships represent the Selection fit approach.

Data analysis here relates to the first part of the **fourth research objective** (*to examine the relationship between contingent variables and the effectiveness of MCS*) and the first part of the **sixth research question** about how contingent variables affect MCS effectiveness.

Table 8.2 Summary of Hypotheses Tests Related to the Influence of Organisational Variables on MCS Effectiveness

Hypotheses	R^2	*Sig.*	*Comment*
H7 Centralisation, as an aspect of organisational structure, influences the effectiveness of an MCS.	.245	.000	Accepted
H8 Formalisation, as an aspect of organisational structure, influences the effectiveness of an MCS.	.614	.000	Accepted
H9 Environmental uncertainty influences the effectiveness of an MCS.	.400	.000	Accepted
H10 The level of manufacturing process complexity influences the effectiveness of an MCS.	.070	.054	Rejected
H11 Competitive strategy influences the effectiveness of an MCS.	.405	.000	Accepted

The findings presented in Table 8.2 suggest that organisational variables vary in their influence on MCS effectiveness. Four variables - namely, centralisation, formalisation, environmental uncertainty, and competitive strategy - have a positive influence on the effectiveness of MCS. The findings are consistent with those of Bruns and Waterhouse (1973), Merchant (1981), and Chang et al. (2003) that authority delegation within an organisation enables managers to be more flexible to make the desired decisions in the presence of relevant information which in turn may positively influences the organisational MCS and performance. The results also support earlier research findings by Fredrickson (1986), Gerdin (2005), and Nicolaou (2000) who reported a positive influence of formalisation on the effectiveness of MAS/MCS design. The positive influence of environmental uncertainty on MCS effectiveness found here is similar to those of Chenhall and Morris (1986) and Abdel-Kader and Luther (2008) that under high uncertainty circumstances, managers tend to demand more broad and timely MAI to achieve tasks and to be able to assess organisational success or failure. In line with expectations, the study finding confirms most of earlier research findings (e.g. Govindarajan, 1988, Chenhall and Morris, 1995, Kober et al., 2003, Jermias and Gani, 2004, Naranjo-Gil and Hartmann, 2006) in relation to the strong positive relationship between competitive strategy and MCS effectiveness. Finally, the variance in MCS effectiveness that could be explained by each of those variables ranges between 24.5% and 61.4% (see R^2 in Table 8.2). It is also notable that the highest proportion of this variance was explained through the

formalisation variable. One possible explanation of this significant percentage is due to the more bureaucratic types of MCS, formal control type in particular (a mean score of 3.65), being adopted and used in these companies, consequently following formal procedures have dominated and influenced the way of carrying out and achieving companies' desired goals.

On the other hand, no significant relationship exists here between the level of manufacturing process complexity and the effectiveness of MCS. This finding is similar to those reported by Abdel-Kader and Luther (2008) that no relationship between manufacturing process complexity and the sophistication level of MAPs. However, the finding here disagrees with other studies results that suggest a negative relationship between manufacturing process complexity and the organisational as well as the related systems' performance (e.g. MacDuffie et al., 1996, Tor et al., 1999, Bozarth et al., 2009). In contrast, empirical evidence suggests that the level of manufacturing complexity influences MAI (e.g. costing systems, budgeting systems), which in turn may lead to a performance improvement (e.g. Bruggeman and Slagmulder, 1995, Baines and Langfield-Smith, 2003). In other words, the level of complexity could influence MCS effectiveness indirectly through MAI usefulness.

8.2.4 Findings Related to the Mediating Role of MAI Usefulness on the Relationship between Organisational Variables and MCS Effectiveness

The preceding sub-section has presented the findings of the initial (total) individual influence of organisational variables on the effectiveness of MCS. This sub-section takes the analysis of previous relationships to a more complex level by introducing the potential effect of a third variable, namely the mediator. Preacher and Hayes's (2004) macro, as mentioned in Chapters Four and Seven, was utilised to achieve the second part of the **fourth research objective** (*the role of MAI usefulness in the contingent relationships*) and the second part of the **sixth research question** about whether MAI usefulness mediates contingent relationships between organisational variables and MCS effectiveness. This part of the analysis stands for the interaction fit approach as formulated in ***hypotheses 12-16.*** Table 8.3 summarises and presents the results of the related hypotheses tests.

Apart from the level of manufacturing process complexity variable; the findings shown in Table 8.3 suggest that MAI usefulness has a mediating effect on the relationship between organisational variables and the effectiveness of MCS. However, this mediating effect varies, in nature, from one relationship to another. It can be seen that the usefulness of MAI accounts for full mediating effect only on the relationship between centralisation and MCS effectiveness. That is due to the presence of significant total as well as indirect effects (paths ***c***, ***a***, ***b*** in Table 8.3), but centralisation variable no longer contributes to the prediction of MCS effectiveness once MAI usefulness is introduced (i.e. path ***ć*** is not significant). This confirms the importance of the level of centralisation in MAS design which in turn leads to an effective MCS design and use. The level of authority delegation in large manufacturing companies in Libya seems to have a positive influence on MAI usefulness to ensure appropriate management actions and decision-making (Chenhall and Morris, 1986, Teerooven and Bhagtaraj, 2008).

However, when thoroughly analysing the data by detecting the individual mediating effect of the four dimensions of MAI, the results reveal that the aggregation dimension has a full mediating effect on the relationship between centralisation and MCS effectiveness, whereas the other three dimensions only have a partial contribution to this relationship (see Chapter Seven, Table 7.6). These additional findings imply that the overall full mediating effect of MAI usefulness seems to be driven by the aggregation dimension.

Table 8.3 Summary of Hypotheses Tests Related to the Mediating Effect of MAI Usefulness

Hypotheses	*Path c*		*Path a*		*Path b*		*Path ć*		*Sobel test "ab"*		*Comment*
	B	***t***	***B***	***t***	***B***	***t***	***B***	***t***	***B***	***Z***	
H12 The usefulness of MAI has a mediating effect on the relationship between centralisation and the effectiveness of MCS.	.354	**4.108*** **	2.507	**4.578*** **	.090	**4.954*** **	.129	1.525	.225	**3.326*** **	Accepted FM
H13 The usefulness of MAI has a mediating effect on the relationship between formalisation and the effectiveness of MCS.	.690	**9.087*** **	3.925	**6.713*** **	.043	**2.489***	.522	**5.280*** **	.168	**2.311***	Accepted PM
H14 The usefulness of MAI has a mediating effect on the relationship between environmental uncertainty and the effectiveness of MCS.	.569	**5.885*** **	3.804	**6.112*** **	.072	**3.747*** **	.295	**2.598***	.275	**3.164*** *	Accepted PM
H15 The usefulness of MAI has a mediating effect on the relationship between level of manufacturing process complexity and the effectiveness of MCS.	.257	1.973	1.781	**2.106***	.101	**6.244*** **	.076	.741	.180	**1.973***	Rejected IE
H16 The usefulness of MAI has a mediating effect on the relationship between competitive strategy and the effectiveness of MCS.	.619	**5.951*** **	4.075	**6.013*** **	.072	**3.757*** *	.328	**2.708*** *	.291	**3.155*** *	Accepted PM

*FM: Full mediation; PM: Partial mediation; IE: Indirect effect; * p < .05; ** p < .01; *** p < .001*

The findings also indicate that the influence of formalisation, environmental uncertainty, and competitive strategy on the effectiveness of MCS was partially mediated by the usefulness of MAI. These findings are similar to those of Baines and Langfield-Smith (2003), Chong and Chong (1997), Mia and Clarke (1999), Naranjo-Gil and Hartmann (2007), and Nicolaou (2000) that MAI plays an important role on the relationship between these contingent variables and the effectiveness of MCS. In addition, the only difference between these findings and earlier findings, related to centralisation variable, is that each of the three contingent variables (i.e. formalisation, environmental uncertainty, and competitive strategy) continue to contribute to the prediction of MCS effectiveness even when the usefulness of MAI is introduced (see paths ***c***, ***a***, ***b***, and ***ć*** in Table 8.3 for each variable). These findings imply that the usefulness of MAI has a partial contribution on the mentioned relationships in manufacturing companies operating in Libya, suggesting that other variables, in addition to MAI usefulness, could have the potential mediating effect on these relationships (Mathieu and Taylor, 2006).

However, exploring these aggregate partial mediating effects related to each dimension, revealed the actual drivers of these effects (see Chapter Seven, Table 7.6). With respect to formalisation variable, only scope and integration dimensions were found to be partially mediating the influence of formalisation on MCS effectiveness; thus the aggregated partial mediating effect of MAI was driven by those two dimensions. This means that as the level of formalisation increases (more rules and procedures are applied) in the sampled companies, managers seem to benefit from internal and external focus information, financial and non-financial information, past and future-oriented information, as well as information on different departments activities to improve the likelihood of observing and interpreting strategic issues which in turn positively influence the adopted MCS. On the other hand, all four MAI dimensions were found to be relevant and participating in the aggregate partial mediating effect of MAI usefulness on the relationship between environmental uncertainty as well as competitive strategy, and the effectiveness of MCS.

Given the insignificant initial relationship that was found between the level of manufacturing process complexity and MCS effectiveness (i.e. path ***c*** is not

significant) the mediating role of MAI usefulness cannot be detected. In this case, only an indirect effect could be detected. In this context, even with the introduction of MAI usefulness to the initial relationship, complexity level continues not to contribute to the prediction of MCS effectiveness (i.e. path ***ć*** is not significant). Therefore, the findings confirm the indirect effect of the level of manufacturing process complexity on the effectiveness of MSC through MAI usefulness. The significant positive relationship between level of manufacturing process complexity and usefulness of MAI (path ***a***), implies that managers of large manufacturing companies in Libya emphasis the benefits of MAI as the level of complexity increases. In addition, MAI usefulness has a significant positive association with MCS effectiveness with the presences, and controlling for the effect, of the level of complexity (see path ***b***, Table 8.3), thus, this part completes the indirect effect path. These findings support previous empirical evidence (e.g. Baines and Langfield-Smith, 2003), and would signify that as the manufacturing process gets more complicated the information users in large manufacturing companies in Libya would perceived MAI useful in planning, monitoring, controlling and directing activities, which in turn leads to a better performance of their MCS. Although the findings indicate that the overall MAI usefulness transmitted the influence of manufacturing process complexity on MCS effectiveness, exploring the data revealed that only two dimensions have had the essential role in this indirect effect. Specifically, it was found that aggregation and integration dimensions have played the transmitter part in the relationship between level of manufacturing process complexity and MCS effectiveness.

8.3 Research Contributions

This research has several contributions to the knowledge related to the role of MAI in MCS in general and to the complex relation between MCS and strategy in particular as well as implications for researchers and practitioners. These are summarised as follows:

- While most previous studies on MCS and strategy have mainly investigated the nature of control systems in relatively stable environments (see Chapter Three), there is not much known about these systems in emerging and less stable environments. Therefore, the current study contributes to the literature by providing evidence from an emerging economy on the types of MCS and the role of MAI in facilitating the effective design and use of these systems.

- Although many of the previous studies have utilised a contingency theory approach, they built overly simplistic theoretical frameworks to try to understand the complex relationship between MCS and organisational variables in general and strategy in particular. A key aspect of this simplicity is the exclusion of critical dimensions of contingent variables (e.g. formalisation) this type of study can never be complete without. Therefore, by adopting an inclusive approach to contingency relationships, the current study contributes to knowledge by enabling a more informative use of contingency theory in the context of MCS. Key to this approach is the belief that the characteristics of MAI *mediate* the relationship between contingency variables and the effect design and use of MCS in real life organisations in an emerging economy.

- Most of previous studies have focused on accounting-based controls in studying and defining MCS, and fewer have utilised non-accounting controls in conceptualising MCS. Despite the fact that limited effort has been made to combine both classifications, more comprehensive and detailed view of MCS is required. Thus, this research addresses wider view of MCS by considering them in terms of more/less bureaucratic and shedding light on how MAI could facilitate the effective design and use of these systems.

- While most of previous studies on the effective design of MAS that investigated the mediating effect have paid attention to either the scope dimension of MAI solely or with one or two other dimensions (see Chapter Three), this study has examined all four dimensions of MAI classified by Chenhall and Morris (1986) to try to paint a clear picture of the role of MAI on the relationship between organisational variables and successful and effective design of MCS. As the results presented in the previous chapter show, considering all four dimensions offered better opportunity to capture a holistic view of the role of MAI, and later breaking it down into four distinctive dimensions to identify the precise relevance of each dimension in the relationship between organisational variables and MCS.

- A significant contribution of this study is in relation to how to identify, measure, and interpret mediated and moderated relationships. There are three points to accentuate here. First, as highlighted by Gerdin and Greve (2004), there is some confusion in the management accounting literature as to what is moderator vs. mediator variables. For instance, authors of some previous studies (e.g. Chong and Chong, 1997, Chong and Eggleton, 2003) wrongly established the consistency or contradiction of their findings with those of other studies, not realising that moderation and mediation results are not directly comparable. As pointed out in Chapter Two both models could be valid but only one can paint a clear picture, as they represent totally different relationships, therefore comparing results obtained from different models is questionable. Second, as explained in Chapters Three, Four, and Seven, some of the management accounting studies (e.g. Mia, 1993, Teerooven and Bhagtaraj, 2008) that investigated the mediation relationship, reported a *mediating* effect of a third variable such as MAI usefulness when in fact their findings only indicated an *indirect* effect of the independent variable on the dependent variable via that third variable. In other words, those studies neglected the initial (total) effect of the independent variable on the dependent variable and incorrectly proceeded to establish a mediating effect rather than indirect effect. Third, and most importantly, none of the previous management accounting studies that examined and reported the mediating effect distinguished between full and partial mediation. This distinction is important for properly

studying contingency relationships and examples of this can be found in non-accounting literature (e.g. Preacher and Hayes, 2004, Mathieu and Taylor, 2006, MacKinnon and Luecken, 2011). Therefore, this distinction between full and partial mediation effects and the isolation of indirect effect, as demonstrated in this study, offer a better understanding and provide a deeper interpretation to the intervening relationships which may reduce the criticisms (e.g. Chenhall, 2003) that have been levelled at contingency theory as a viable explanatory framework of complex organisational phenomena.

- Unlike previous empirical research on management accounting in Libya which was mainly focused on MAPs (e.g. Abulghasim, 2006, Alkizza, 2006, Leftesi, 2008, Abugalia, 2011), the present study has addressed, among other things, the product of MAS (i.e. the usefulness of MAI). Specifically, the main concern of previous studies was either to assess the adoption rate or explore the usage state of traditional as well as advanced MAPs in Libyan companies and, therefore, dealt with only sub-systems of MCS, which is considered not sufficiently broad to try to understand the effective design and use of these systems (Langfield-Smith, 2007). Therefore, by explicitly focusing on MAI in relation to MCS, this study contributes to enabling a better understanding of MAPs in an emerging economy.

8.4 Limitations and Future Research

As with all research in management accounting and other areas, this research is subject to a number of limitations and provides suggestions for future research. These are presented next.

- As mentioned in Chapter Four, the study sample consisted of large manufacturing companies only, so the findings could not be generalised to medium and small manufacturing companies or other organisations in other industries such as service or to companies in another country. Consequently, replicating this study on different industries in Libya or other countries (developed or developing countries) would indeed increase the possibility of generalising the findings and also enhance as well as develop the understanding of the research issues.

- As indicated in Chapters Four and Five, the responding companies fall into different ownership categories (i.e. state-owned, private and joint-venture), making it difficult to freely generalise the findings across all company types. Hence, future research may consider investigating further the potential influence of ownership type on the relationships examined in this study. Another limitation is related to respondent background. Although every effort was made to ensure that the appropriate respondents participated in the questionnaire survey, it is possible that the respondents' background (top management diversity) influenced their views of the research issues addressed by the study, their interpretation of the questionnaire and, consequently, their responses.

- The study depended entirely on utilising a questionnaire as the main tool for data collection, and then the quantitative data were analysed statistically; thus, the disadvantages of using this method of data collection and the statistical techniques used add to the limitations of this research. Another limitation is related to the small sample size, although it was regarded as adequate in this case due to the relatively small population of large companies in Libya.

- Although the inclusion of the research variables was based on an intensive review of the relevant theoretical as well as empirical literature, there is a likelihood of having inadvertently omitted some essential variables. Hence, there is an opportunity for future research to identify and examine the influence of any missing variables. For instance, other organisational structure aspects, such as specialisation and standardisation, could be potential variables influencing MCS design and use. In addition, culture, national and organisational, may determine the types and use of MCS as well as the required MAI in the Libyan context.

In addition to the above, several questions have arisen from the findings and discussions of this research study, which would imply the need for more empirical research to be done in this area. The following are suggested opportunities for future research:

- As indicated by this research that the competitive strategy has a significant influence on the design and use of MCS, future research can build on these findings by further exploring the determinants of effective design and use of MCS in more depth through comparative case studies of manufacturing companies in a developing country, for example by emphasising different strategic priorities (i.e. cost leadership, differentiation). Another possible area of future research is to investigate the role of transfer pricing systems in relation to the design and use of MCS in large companies. For instance, by examining the influence of adopting transfer pricing policy on MCS elements such as planning, evaluating and rewarding systems.

- Given the cross-sectional nature of this study's methodology, causal relationships between research variables cannot be assumed from the regression analysis results, except the statement that the results are in accordance with the hypotheses stated in the study, and should be treated with more caution. Thus, words used throughout the study such as 'influence', 'effect', or 'affect', which refer to causality, should be carefully interpreted. A possible future research opportunity is to investigate and evaluate the direction of causality between strategy and MCS (i.e. two-way interaction) through longitudinal approach study. It could also further our understanding of how effective MCS for strategy formulation and implementation evolve over time.

- In this research, two forms of contingency fit, selection and interaction, were used to provide empirical evidence of the individual influence of the investigated contingent variables on MCS effectiveness and role of MAI in these relationships, while the simultaneous influence was beyond the interest of this study (systems fit approach). Thus, further research could adopt a systems fit approach to examining MCS/MAI relationships, provided primary data can be secured from sufficiently large samples.

- The research framework has classified the influence of organisational variables on the effective design of MCS as a simple causal sequence (total effect of the independent variables on the dependent variable) and examined the potential effect of MAI usefulness on this causal sequence (mediating variable). In some

cases, the mediating effect was partial or not found. Thus, it is worth investigating the effect of other potential mediators that may contribute to the association between organisational variables and MCS effectiveness. In addition, the combination of moderating and mediating model variables would be promising for future research. Specifically, it would be fruitful to investigate for which group or at what level the mediation effect, found in this study, works, by examining whether there is moderated mediation. This could be achieved by introducing a moderator variable to the mediating effect, for example by investigating whether the mediating role of MAI depends on the extent to which there has been a positive change in the MAS (e.g. implementation of advanced MAPs). Another possibility is to introduce the effect of top management team diversity or level of MAI users' satisfaction to the mediation relationship and examine the moderated mediation. In case mediation is not established, the analysis could than turn to finding what some authors (e.g. Muller et al., 2005, Preacher et al., 2007) call the conditional indirect effect.

- In this research, the importance of MAI for planning, control and problem solving was emphasised by large manufacturing companies in Libya, whereas the availability of these information, for the same purpose, was relatively low. A possible area of research may be to investigate why relevant information is not reasonably available, and does this level of availability satisfy the decision makers' needs in these companies. It also would be useful to investigate whether particular elements of MCS, such as performance measurement system or cost management, relate to managers' mental model development and/or mental model confirmation (i.e. learning), and how this relationship links to managerial performance and MAPs change. Research on this particular point could draw on the relatively new literature that relates learning concepts to managerial systems (Hall, 2011).

8.5 Summary and Conclusion

This chapter presented the discussion and conclusion of the study findings. Several explanations and interpretations were made with respect to the relationship between organisational variables and the effective design and use of MCS in large

manufacturing companies in a developing country, namely Libya. The role of MAI in these relationships was also identified and the various scenarios of this role were explained and interpreted in detail. Moreover, this chapter summarised the main contributions to knowledge of the current study, including the distinctions between two forms of mediating effect, full and partial, and between mediation and indirect effects. These distinctions are not evident in previous relevant research, hence the usefulness of this study in showing the appropriate methods to use to analyse and interpret various intervening forms. Future research can build on this study's findings, contributions, limitations and suggestions in examining the design and use of MCS and the role of MAI in facilitating their effectiveness in both developed and developing countries.

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Appendices

Appendix A: Research Questionnaire

Dear Participant

I am a Ph.D. student at the University of Huddersfield, UK, currently preparing my doctoral dissertation on the

Role of Management Accounting Information in Facilitating the Design of Effective Management Control Systems (MCS) in Large Manufacturing Companies in Libya

This research project aims to explore and understand the intricate relationship between MCS and strategy and the role of management accounting information in this relationship in large manufacturing companies in Libya. This aim cannot however be achieved without your and other respondents' co-operation in completing the enclosed questionnaire and providing valuable information about MCS in practice. The questionnaire has been carefully designed for this study and is informed by current knowledge in this field, including recent empirical studies in both developed and developing countries.

Please answer all the questions that are relevant to your company and make any additional comments using the space provided or additional sheets if necessary. If you feel you are not the right person to complete the questionnaire, please pass it on to the relevant person in your company.

I would like to reassure you that your response will be treated as strictly confidential and will only be used for the purposes of this research. It will not be disclosed to third parties under any circumstances

Should you need further information or clarification regarding this research study, please do not hesitate to contact me or my director of studies at the addresses below.

Thank you for your co-operation in completing this questionnaire.

Yours sincerely

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Glossary

- ***Management Accounting Systems (MAS):***
  The formal systems designed to provide information from the internal and external environment to managers.

- ***Management Control Systems(MCS):***
  The process which helps managers ensure that a company's strategies and plans are successfully implemented. This normally encompasses the company's MAS.

- ***Corporate level strategy:***
  Is concerned with the overall purpose and scope of an organisation and how value will be added to the different parts of the organisation

- ***Competitive/business level strategy:***
  Is about how to compete successfully in particular markets in order to deliver corporate level strategy, for example through:

  - *Cost leadership* = the ability to make quality products at lower cost.

  - *Product Differentiation* = the ability to build unique features into products to offer more choice to customers.

- ***Tactical/operational level strategy:***
  Is concerned with how the component parts of an organisation such as a strategic business unit or a cost centre deliver effectively the corporate and business-level strategies in terms of resources, processes and people

- ***Strategy formulation:***
  The managerial activity involved in forming strategies.

Section A- General Information about Yourself

For questions A1 to A3 below please tick [✓] relevant answers to indicate:

A1 Job title and position

[ ] Chief of management board
[ ] Member of management board
[ ] Chief Executive Officer
[ ] Finance Director
[ ] Management Accountant
[ ] Other *(please specify)* ……..

A2 Experience	Less than one year	1-5 years	6-10 years	More than 10 years
In the current job	[ ]	[ ]	[ ]	[ ]
With the current company	[ ]	[ ]	[ ]	[ ]

A3 Highest qualification

[ ] Bachelor's degree
[ ] Post-graduate (e.g. MSc, MBA, Ph.D.)
[ ] Professional qualifications (*please specify*)……..
[ ] Other *(please specify)*……..

Section B- General Information about Your Company

For questions B1 to B3 below please tick [✓] relevant answers to indicate:

B1 Main industrial sector of your company

[ ] Food
[ ] Chemical
[ ] Engineering and electrical
[ ] Metal
[ ] Cement and building materials
[ ] Oil and gas
[ ] Other *(please specify)* …….....

B2 Company age in the current main industry.

[ ] Less than 5 years
[ ] 5- Less than11 years
[ ] 11-20 years
[ ] More than 20 years

B3 Type of company ownership:

- State-owned company [ ]
- Private company [ ]
- Joint venture (shared between the State and a foreign partner) [ ] *(The share of the State is …….. %)*
- Joint venture (shared between the State and private company) [ ] *(The share of the State is …….. %)*
- Joint venture (shared between private company and a foreign partner) [ ] *(The share of the company is …….. %)*

Section C- Strategy Formulation: Choices and Process

Questions C1 to C3 below relate to strategy formulation in your company

C1 For each of the following three levels of strategic planning, please indicate the approximate length of time for which the strategy is formulated.

• Corporate level strategy	[……..year(s)]
• Competitive /business level strategy	[……..year(s)]
• Tactical /operational level strategy	[……..year(s)]

C2 Please indicate, using the 5-point scale below, the extent to which the following people/groups are involved in the strategy formulation process at each of the following levels of strategy *(please circle all relevant answers).*

Never 1 | Rarely 2 | Sometimes 3 | Often 4 | Always 5

People/Groups	**Corporate level**	**Competitive / business level**	**Tactical / operational level**
The General Assembly of the company.	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Senior managers (e.g. Board of directors, Chief Executive Officer).	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Middle managers (e.g. Heads of departments).	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Operational managers (e.g. Divisions heads).	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Other people/groups *(please specify)*..... ……..	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

C3 Please indicate, using the 5-point scale below, to what extent the following statements describe strategy formulation in your company *(please circle all relevant answers)*

Not at all 1 | To a slight extent 2 | To a moderate extent 3 | To a significant extent 4 | To a considerable extent 5

The formulation is a formal systematic process and supported by strategic thinking methods (e.g. SWOT, VCA).	1 2 3 4 5
The company's resources and competences required to achieve the chosen strategy are well defined.	1 2 3 4 5
There is a strong understanding of customers' needs and preferences.	1 2 3 4 5
The functions and actions are organised and work closely together to create superior value for customers.	1 2 3 4 5
The process of strategy formulation takes into account possible changes in business environment (e.g. exploit opportunities and/or meet threats in the environment, now or in the future).	1 2 3 4 5
The strategy formulation process is based on attaining and sustaining the greatest competitive advantage for the company.	1 2 3 4 5
During the strategy formulation process, strategy is divided into achievable sub-targets for each unit with clear performance criteria.	1 2 3 4 5
Activities that are involved in carrying out the desired strategy are clearly identified and attached with action plans.	1 2 3 4 5
Adaptability/ flexibility of the company's strategy in the light of emerging opportunities/ threats.	1 2 3 4 5
The new strategy is informed by the preceding strategy.	1 2 3 4 5

Questions C4 and C5 below relate to your company's competitive strategy.

C4 Please indicate, using the 5-point scale below, the degree of emphasis on the following activities in relation to your company's strategic priorities *(please circle all relevant answers).*

Not emphasised 1	Slightly emphasised 2	Moderately emphasised 3	Significantly emphasised 4	Considerably emphasised 5

a. Cost leadership priorities:						
Improving the efficiency of the production system by investing in new technology.	1	2	3	4	5
Improving the efficiency of the production system through better utilisation of existing resources.	1	2	3	4	5
Achieving lower product cost than competitors.	1	2	3	4	5
Synchronising production and support activities.	1	2	3	4	5
b. Product differentiation priorities:					
Customizing products to customer needs.	1	2	3	4	5
Improving product design.	1	2	3	4	5
Improving product quality by preventing production defects.	1	2	3	4	5
Providing unique product features that are distinct from those of competitors.	1	2	3	4	5
Offering a broader range of products than competitors.	1	2	3	4	5
Launching new products in a timely manner.	1	2	3	4	5
Broadening product availability and distribution.	1	2	3	4	5
Making dependable delivery promises.	1	2	3	4	5
Providing effective after-sales service and support.	1	2	3	4	5

C5 In relation to question C4 above, please indicate using the 5-point scale below the role of management accounting information in strategic priorities in your company.

Not Important 1	Slightly Important 2	Moderately Important 3	Significantly Important 4	Considerably Important 5

a. Cost leadership priorities	1	2	3	4	5
b. Product differentiation priorities	1	2	3	4	5

Section D- Organisational, Environmental and Managerial Characteristics

Questions D1 and D2 below relate to organisational structure (i.e. centralisation in decision management and formalisation) in your company.

D1 The statements in this question relate to the internal operating environment of your company. Using the 5-point scale below, please indicate the extent to which decisions are delegated to middle/ operational managers by top management in your company *(please circle all relevant answers).*

Never delegated 1	Rarely delegated 2	Sometimes delegated 3	Often delegated 4	Always delegated 5

Decisions to introduce new products.	1	2	3	4	5
Decisions to develop existing products.	1	2	3	4	5
Product pricing decisions.	1	2	3	4	5
Decisions on major changes to processes (e.g. introduction of new manufacturing technology)	1	2	3	4	5

Decisions related to developing exiting markets.	1	2	3	4	5
Personnel policy decisions.	1	2	3	4	5
Decisions related to entering new markets.	1	2	3	4	5
Decisions related to capital budgeting	1	2	3	4	5

D2 Using the 5-point scale below, please indicate to what extent the following statements about rules, routines and job descriptions guide managers in your company *(please circle all relevant answers)*.

Not at all	To a slight extent	To a moderate extent	To a significant extent	To a considerable extent
1	2	3	4	5

Whatever situation arises, managers have policies and procedures to follow in dealing with it.	1	2	3	4	5
All rules and procedures are usually written.	1	2	3	4	5
The managers are monitored for compliance with established procedures.	1	2	3	4	5
Sometimes informal agreements reached to handle special situations.	1	2	3	4	5
There are strong penalties for failure to comply with established procedures.	1	2	3	4	5

Questions D3 below relates to the degree of *environmental uncertainty* perceived by managers in your company

D3 Please indicate, using the 5-point scale below, to what extent the following items are predictable by managers in your company *(please circle all relevant answers)*.

Not at all	To a slight extent	To a moderate extent	To a significant extent	To a considerable extent
1	2	3	4	5

Raw material availability.	1	2	3	4	5
Raw material prices.	1	2	3	4	5
Customer tastes and preferences.	1	2	3	4	5
Market demand.	1	2	3	4	5
Market activities of competitors.	1	2	3	4	5
Production and information technologies.	1	2	3	4	5
Government regulations and policies.	1	2	3	4	5
Industry-specific changes.	1	2	3	4	5
Economic environment (e.g. inflation, growth rate, labour market).	1	2	3	4	5

Questions D4 to D6 below relate to *manufacturing technology* in your company.

D4 Please tick below **[✓]** the answer that best describes your company's production process

[ ] Job shop [ ] Paced assembly [ ] Batch flow [ ] Continuous flow

[ ] Other *(please specify)* …….

D5 Please tick below [✓] all relevant answers to indicate which of the following production methods are currently used by your company.

- Traditional, non-advanced production system [ ]
- Just- in- time (JIT) production system [ ]
- Flexible manufacturing system (FMS) [ ]
- Total quality management (TQM) [ ]
- Other *(please specify)* …….. [ ]

D6 In relation to the level of manufacturing process complexity, please indicate using the 5-point scale below to what extent the following statements about product diversity apply to your company *(please circle all relevant answers)*:

Not at all	To a slight extent	To a moderate extent	To a significant extent	To a considerable extent
1	2	3	4	5

Products manufactured by the company are technologically diverse.	1	2	3	4	5
Significant differences exist in the batch size of manufactured products	1	2	3	4	5
Within product lines, different processes are used to manufacture the products	1	2	3	4	5
Changes in volumes of products are frequent	1	2	3	4	5
Support departments' resources consumed by each product are different	1	2	3	4	5

Section E- Management Control System (MCS) Design and Effectiveness

Question E1 below relates to the determinants of a successful design of MCS

E1 Please indicate, using the 5-point scale below, to what extent the following statements apply to your company *(please circle all relevant answers).*

Not at all	To a slight extent	To a moderate extent	To a significant extent	To a considerable extent
1	2	3	4	5

The MCS exists mainly to ensure successful implementation of strategy	1	2	3	4	5
The current MCS is sufficiently adequate for the company	1	2	3	4	5
The success of the MCS depends on the quality of its design	1	2	3	4	5
The incentive schemes play a key role in the success of the MCS	1	2	3	4	5
The success of the MCS depends on senior management commitment	1	2	3	4	5
The MCS is designed to be adaptable to changing circumstances	1	2	3	4	5
Management accounting information is vital for the MCS	1	2	3	4	5

Question E2 below relates to the ways of *motivating, monitoring, controlling and directing activities* in your company

E2 Please indicate, using the 5-point scale below, the extent to which the following statements apply to your company *(please circle all relevant answers).*

Never	Rarely	Sometimes	Often	Always
1	2	3	4	5

Managers have a high degree of discretion and autonomy in making decisions and responding to new opportunities or challenges.	1	2	3	4	5
Managers' decisions and actions are monitored on an ongoing basis rather than focusing on the attainment of the desired targets.	1	2	3	4	5
Formal communications (e.g. meetings, reports) in passing information up and down the hierarchy.	1	2	3	4	5
Evaluation of performance in any period by comparing results with those of competitors in the same industry.	1	2	3	4	5
Written explanations for significant changes between current year results and the results of previous years.	1	2	3	4	5

Formal reports on the achievement of targets (e.g. management reports, monthly performance reports).	1	2	3	4	5
Managers' targets and the actions to achieve the targets are precise.	1	2	3	4	5
Written rules, policies, procedures and targets are communicated formally to all employees, including managers.	1	2	3	4	5
Managers' actions and targets are frequently monitored.	1	2	3	4	5
Budget variance analysis and investigation to ensure the efficient and effective execution of operations.	1	2	3	4	5
Formal appraisal of managers on a periodic basis.	1	2	3	4	5
Controls (regulations) are applied throughout the company uniformly and impersonally to avoid involvement with individual personalities and personal preferences of employees, including managers.	1	2	3	4	5
Formal reports relating outputs with inputs consumed (e.g. costs per unit, output per labour hour).	1	2	3	4	5
Managers are rewarded for the achievement of their targets by using financial incentives	1	2	3	4	5
Managers are rewarded for the achievement of their targets by using non-financial incentives	1	2	3	4	5

Questions E3 to E5 below relate to *organisational success* and the *effectiveness of your company's MCS*

E3 Please tick **[✓] one** relevant answer to indicate which performance measures you normally use to determine that your MCS is effective

- Through financial performance indicators only [ ]
- Through non-financial performance indicators only [ ]
- Through a mix of financial and non-financial performance indicators [ ]

E4 Please indicate, using the 5-point scale below, to what extent you use the following performance indicators for measuring your company's organisational success *(please circle all relevant answers)*.

Not at all	To a slight extent	To a moderate extent	To a significant extent	To a considerable extent				
1	2	3	4	5				
Operating profits				1	2	3	4	5
Cash flow from operations				1	2	3	4	5
Profit to sales ratio				1	2	3	4	5
Return-on-investment				1	2	3	4	5
Sales growth rate				1	2	3	4	5
Market share				1	2	3	4	5
Market development				1	2	3	4	5
New product development				1	2	3	4	5
Cost reduction programmes				1	2	3	4	5
Personnel development				1	2	3	4	5
Research and development activities				1	2	3	4	5
Contribution to social activities				1	2	3	4	5

E5 In addition to the performance indicators listed in question **E4** above; please indicate to what extent your company also uses external benchmarks to determine the effectiveness of the MCS *(please circle all relevant answers).*

	Not at all 1	To a slight extent 2	To a moderate extent 3	To a significant extent 4		To a considerable extent 5	
Direct competitors	1	2	3	4	5		
Averages for own industry	1	2	3	4	5		
Companies from other industries	1	2	3	4	5		

Section F: Management Accounting Information

Question F1 to F4 below relate to *the characteristics of management accounting information (i.e. scope, timeliness, aggregation and integration)* in your company.

Please indicate, using the 5-point scales given, to what extent each of the items listed below are ***important/available*** for planning, control and problem solving activities *(please circle all relevant answers).*

(1=Not important/Not available; 3=Moderately important/Moderately available; 5= Very important/ Always available)

F1 ***Scope***

Importance					**and**	**Availability**				
1	2	3	4	5	Information that relates to possible future internal events (e.g. new capital projects)	1	2	3	4	5
1	2	3	4	5	Non-financial information that relates to production process (e.g. output rates, scrap levels, machine efficiency, employee productivity)	1	2	3	4	5
1	2	3	4	5	Quantification of the likelihood of future events occurring (e.g. probability estimates).	1	2	3	4	5
1	2	3	4	5	Information on broad factors external to your company (e.g. economic conditions, population growth).	1	2	3	4	5
1	2	3	4	5	Information that relates to possible future external events (e.g. customer preferences, attitudes of government and consumer bodies, competitive threats, manufacturing technology developments).	1	2	3	4	5
1	2	3	4	5	Non-financial information that relates to product markets (e.g. market size, market growth).	1	2	3	4	5

F2 ***Timeliness and frequency of reporting***

Importance					**and**	**Availability**				
1	2	3	4	5	Information that enables managers to monitor and control activities is available immediately upon request.	1	2	3	4	5
1	2	3	4	5	Relevant information is supplied to managers automatically upon its receipt into information systems or as soon as processing is completed.	1	2	3	4	5
1	2	3	4	5	Reports are provided frequently on a systematic, regular basis (e.g. daily, weekly reports).	1	2	3	4	5
1	2	3	4	5	There is no delay between an event occurring (e.g. competitors' actions, market demand) and relevant information being reported to managers.	1	2	3	4	5

F3 ***Aggregation***

Importance					and	Availability				
1	2	3	4	5	Information is provided on the different sections or functional areas in your company (e.g. marketing and production, or sales, cost, or profit centres).	1	2	3	4	5
1	2	3	4	5	Information on the effect of events on particular time periods (e.g. monthly/ quarterly /annual summaries, trends, comparisons)	1	2	3	4	5
1	2	3	4	5	Information that has been processed to show the influence of events on different functions, such as marketing or production, associated with particular activities or tasks.	1	2	3	4	5
1	2	3	4	5	Information on the effect of different sections' activities on summary reports (e.g. profit, cost, and revenue reports for other sections).	1	2	3	4	5
1	2	3	4	5	Information provided in formats suitable for input into decision models (e.g. discounted cash flow analysis, incremental or marginal analysis, inventory analysis, credit policy analysis).	1	2	3	4	5
1	2	3	4	5	Information in formats which enable managers to conduct "what if" analysis.	1	2	3	4	5

F4 ***Integration***

Importance					and	Availability				
1	2	3	4	5	Information on precise targets for the activities of all sections within your company.	1	2	3	4	5
1	2	3	4	5	Information on the influence of other individuals' decisions on your area of responsibility.	1	2	3	4	5
1	2	3	4	5	Information on the impact that your decisions will have on other sections in your company.	1	2	3	4	5
1	2	3	4	5	Information that relates to the impact that your decisions would have on the performance of your whole company.	1	2	3	4	5

Please tick [✓] the box if you wish to receive a copy of the aggregated results of this study [ ]

In order to achieve the objectives of this research, and to improve the quality of the data, I hope to **interview some of the respondents** to this questionnaire, probably in July 2010. Your help would be greatly appreciated. **If you are willing to be interviewed, please fill in the section below:**

Company's name: ……

Your name: ……

Your telephone no: ……

Your email : ……

Please refer to the next page for any additional comments

Thank you very much for your assistance in completing this questionnaire. We would appreciate any comments or suggestions you may care to make about any issue mentioned in the questionnaire. You may use the space below, or use a separate sheet and return it with the completed questionnaire or separately.

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Appendix B: Arabic Translation of the Research Questionnaire

جامعـــة هدرسفيلد

التاريخ / /

عزيزي المشارك

أنا طالب دكتوراه في جامعة هدرسفيلد بالمملكة المتحدة، وأعد حاليا بحثاً عن :

" دور معلومات المحاسبة الإدارية في خدمة التصميم الفعال لأنظمة الإدارة والرقابة في الشركات الصناعية الكبرى في ليبيا"

ويهدف هذا البحث إلى توضيح وفهم العلاقة بين الاستراتيجية ونظم الإدارة والرقابة، والدور الذي تلعبه معلومات المحاسبة الإدارية في هذه العلاقة في الشركات الصناعية الكبرى في ليبيا. وهذا الهدف لا يمكن تحقيقه بدون تعاونك وتعاون المشاركين الآخرين في تعبئة هذا الاستبيان وتقديم معلومات مفيدة عن أنظمة الإدارة والرقابة في الواقع العملي.

عليه آمل منك الإجابة على جميع الأسئلة وإذا كان لديك أي ملاحظات ترى أنها تتعلق بما ورد في الاستبيان يمكنك استخدام الجزء المخصص لذلك أو استخدام صفحة أخرى عند الضرورة ترفق مع الاستبيان، وإذا كنت ترى أنك لست الشخص المناسب للإجابة على الاستبيان الرجاء تحويله إلى الشخص المناسب بالشركة.

علماً بأن الإجابات المتحصل عليها بواسطة هذا الاستبيان سوف تحاط بسرية تامة و ستستخدم فقط لأغراض هذا البحث ولن يسمح لأي طرف ثالث بالإطلاع عليها لأي غرض وتحت أي ظرف كان. وأخيرا إذا احتجت إلى أي معلومات أو إيضاحات إضافية تتعلق بهذا البحث، فلا تتردد في الاتصال وذلك على العنوان المبين أدناه.

وشكرا جزيلا على تعاونك معنا لإنجاز هذا البحث

مع خالص التقدير وفائق الاحترام.

عادل رمضان حيدر

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مصطلحات

الرجاء الإطلاع على المصطلحات التالية لتوضيح المقصود منها في الاستبيان.

- **نظم الإدارة والرقابة:**

هي مجموعة الإجراءات التي تساعد المديرين على ضمان تنفيذ استراتيجيات الشركة وخططها بنجاح، وتشمل عادة نظام المحاسبة الإدارية بالشركة.

- **نظام المحاسبة الإدارية:**

نظام مصمم ليقدم المعلومات المحاسبية إلى الإدارة عن البيئة الداخلية والخارجية للشركة.

- **الاستراتيجية العامة للشركة:**

تهتم بالهدف العام للشركة، وكيفية إضافة قيمة لمختلف الأجزاء المكونة للشركة.

- **الاستراتيجية التنافسية/التجارية:**

تهتم بكيفية المنافسة بنجاح في أسواق معينة ليتم الوصول إلى تحقيق الاستراتيجية العامة للشركة، وذلك على سبيل المثال عن طريق:

- استراتيجية القيادة (الريادة) في التكلفة = القدرة على صنع منتجات ذات جودة وبتكاليف منخفضة.
- استراتيجية التميز في المنتجات = القدرة على إنشاء مواصفات مميزة للمنتج ليكون هناك خيارات أكثر للمستهلك.

- **الاستراتيجية التنفيذية/التشغيلية:**

تهتم بالكيفية التي تعمل بها الأجزاء المكونة للشركة مثل الوحدات الإنتاجية والإدارية أو مراكز التكلفة للوصول بفاعلية إلى تحقيق الاستراتيجية التنافسية/التجارية وبالتالي الاستراتيجية العامة للشركة من حيث الأفراد والموارد والعمليات.

- **صياغة وإعداد الاستراتيجية:**

هي النشاط الإداري المتعلق بالمشاركة في تشكيل استراتيجيات الشركة.

الجزء(أ):- المعلومات الشخصية.

من فضلك أجب عن الأسئلة من أ1 إلى أ3 بوضع علامة [✓] أمام الإجابة المناسبة.

أ1. طبيعة عملك بالشركة	
[ ] رئيس مجلس الإدارة	[ ] عضو مجلس إدارة
[ ] المدير التنفيذي	[ ] المدير المالي
[ ] محاسب إداري	[ ] أخرى (من فضلك حدد).....

أ2. الخبرة	أقل من سنة	من 1-5 سنوات	أكثر من 5-10 سنوات	أكثر من 10 سنوات
بالوظيفة الحالية	[ ]	[ ]	[ ]	[ ]
مع الشركة الحالية	[ ]	[ ]	[ ]	[ ]

أ3. المؤهل العلمي
[ ] بكالوريوس
[ ] دراسات عليا (ماجستير متخصص, ماجستير MBA, دكتوراه)
[ ] مؤهلات متخصصة (من فضلك حدد).....
[ ] أخرى (من فضلك حدد).....

الجزء(ب):- المعلومات العامة عن الشركة.

من فضلك أجب عن الأسئلة من ب1 إلى ب3 بوضع [✓] أمام الإجابة المناسبة.

ب1. النشاط الصناعي الرئيس للشركة.		
[ ] غذائية	[ ] كيمياويات	[ ] كهربية والكترونات
[ ] معادن	[ ] إسمنت ومواد بناء	[ ] نفط و غاز
[ ] أخرى (من فضلك حدد).....		

ب2. عمر الشركة في النشاط الرئيس الحالي.	
[ ]أقل من 5 سنوات	[ ]من 5- أقل من11 سنة
[ ] من11-20 سنة	[ ] أكثر من 20 سنة

ب3. نوعية ملكية الشركة.		
• شركة مملوكة للدولة	[ ]	
• شركة خاصة	[ ]	
• مشاركة بين الدولة وشريك أجنبي	[ ]	*(نسبة حصة الدولة هي.....%)*
• مشاركة بين الدولة وشريك محلي	[ ]	*(نسبة حصة الدولة هي.....%)*
• مشاركة بين شريك محلي وشريك أجنبي	[ ]	*(نسبة حصة الشركة هي.....%)*

الجزء(ج):- صياغة وإعداد الاستراتيجية (الطريقة والخيارات).

الأسئلة من ج1 إلى ج3 بالأسفل: تتعلق بصياغة وإعداد الاستراتيجية بالشركة

ج1 من فضلك قدر طول الفترة الزمنية التي **تصاغ وتعد** على أساسها الاستراتيجية لكل مستوى من مستويات التخطيط الاستراتيجي الثلاث التالية.	
• الاستراتيجية العامة للشركة	[..... سنة]
• الاستراتيجية التنافسية/التجارية	[..... سنة]
• الاستراتيجية التنفيذية/التشغيلية	[..... سنة]

ج2 باستخدام المقياس المبين أدناه, من فضلك حدد **إلى أي مدى يشارك الأفراد أو المجموعات** التالية في **عملية صياغة وإعداد** الاستراتيجية لكل مستوى من المستويات الاستراتيجية التالية *(الرجاء وضع دائرة حول الإجابات المناسبة).*

لا يشارك إطلاقا	**نادرا يشارك**	**يشارك أحيانا**	**عادة يشارك**	**دائما يشارك**
1	**2**	**3**	**4**	**5**

الأفراد أو المجموعات ↓	**المستويات الاستراتيجية**		
	المستوى العام للشركة	**المستوى التنافسي/التجاري**	**المستوى التنفيذي/التشغيلي**
الجمعية العمومية للشركة	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
الإدارة العليا (مثل رئيس مجلس الإدارة، الرئيس التنفيذي)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
الإدارة الوسطى (مثل رؤساء الإدارات)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
الإدارة التشغيلية/التنفيذية (مثل رؤساء الأقسام)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
أفراد/مجموعات أخرى(من فضلك حدد)	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

ج3 باستخدام المقياس المبين أدناه، من فضلك حدد **إلى أي مدى تنطبق** العبارات التالية على الشركة **عند صياغة وإعداد الاستراتيجية** *(الرجاء وضع دائرة حول الإجابات المناسبة).*

لا ينطبق إطلاقا	**ينطبق إلى مدى بسيط**	**ينطبق إلى مدى متوسط**	**ينطبق إلى مدى ملحوظ**	**ينطبق إلى مدى كبير**
1	**2**	**3**	**4**	**5**
تتم عملية الصياغة والإعداد بطريقة رسمية منظمة و مدعومة بأساليب التفكير الاستراتيجي (مثل تحليل أوجه القوة-الضعف- الفرص-المخاطر "SWOT"، وتحليل سلسلة القيمة "VCA")	1	2	3	4 5
يتم تعريف وتحديد موارد وكفاءات الشركة اللازمة لتحقيق الاستراتيجية التي تم اختيارها بشكل دقيق و واضح.	1	2	3	4 5
هناك إدراك قوي لمتطلبات وأذواق المستهلكين.	1	2	3	4 5
يتم تنظيم الوظائف والمهام لتعمل معا بشكل وثيق لخلق قيمة أفضل للعملاء.	1	2	3	4 5
عملية صياغة وإعداد الاستراتيجية تأخذ في الاعتبار التغيرات المحتملة لبيئة الأعمال (مثل الاستفادة من الفرص ومواجهة التهديدات في الوقت الحاضر أو المستقبل).	1	2	3	4 5
تعتمد عملية صياغة وإعداد الاستراتيجية على تحقيق أفضل ميزة تنافسية للشركة والمحافظة عليها.	1	2	3	4 5
يتم تقسيم الاستراتيجية أثناء عملية إعدادها إلى أهداف "مهام" فرعية قابلة للتحقيق لكل وحدة من وحدات الشركة مع معايير واضحة للأداء.	1	2	3	4 5
يتم تحديد الأنشطة التي تساهم في تنفيذ وتحقيق الاستراتيجية المطلوبة بشكل واضح وترفق بخطط لبيان آلية سير العمل.	1	2	3	4 5
تكيف ومرونة استراتيجية الشركة مع الفرص أو المخاطر التي قد تطرأ أثناء تنفيذها.	1	2	3	4 5
تستفيد الاستراتيجيات الجديدة من المعلومات الخاصة بالاستراتيجيات التي سبقتها مباشرة.	1	2	3	4 5

السؤالان ج4 و ج5 بالأسفل:يتعلقان بالاستراتيجية التنافسية/التجارية للشركة.

ج4 باستخدام المقياس الموضح أدناه, من فضلك **حدد درجة التركيز على الأنشطة التالية فيما يتعلق بالأولويات الاستراتيجية** للشركة *(الرجاء وضع دائرة حول الإجابات المناسبة)*.

	لا يركز عليها 1	يركز عليها قليلا 2	يركز عليها بشكل متوسط 3	يركز عليها بشكل ملحوظ 4	يركز عليها بشكل كبير 5
أ.	**<u>أولويات القيادة (الريادة) في التكلفة:</u>** *(لتوضيح معنى هذا المصطلح أكثر يمكن الرجوع إلى قائمة المصطلحات)*				
•	تحسين كفاءة نظام الإنتاج من خلال الاستثمار في التكنولوجيا الجديدة.	1	2	3	4 5
•	تحسين كفاءة نظام الإنتاج من خلال الاستخدام الأمثل للموارد المتاحة.	1	2	3	4 5
•	الوصول بتكلفة المنتجات لمستوى أقل من تكلفة منتجات المنافسين.	1	2	3	4 5
•	التزامن بين أنشطة الإنتاج وباقي الأنشطة المساعدة (حدوثها في آن واحد).	1	2	3	4 5
ب.	**<u>أولويات التميز في المنتج:</u>** *(لتوضيح معنى هذا المصطلح أكثر يمكن الرجوع إلى قائمة المصطلحات)*				
•	تصميم المنتجات طبقًا لاحتياجات العملاء.	1	2	3	4 5
•	تطوير تصميم المنتج.	1	2	3	4 5
•	تحسين جودة المنتج من خلال منع عيوب الإنتاج.	1	2	3	4 5
•	توفير منتج ذو مواصفات فريدة تختلف عما يقدمه المنافسون.	1	2	3	4 5
•	تقديم منتجات أكثر تنوعاً عن ما يقدمه المنافسون.	1	2	3	4 5
•	تقديم المنتجات الجديدة للأسواق في أوقات مناسبة.	1	2	3	4 5
•	توسيع النطاق الجغرافي لانتشار وتوفر المنتجات .	1	2	3	4 5
•	تقديم وعود يمكن الاعتماد عليها لتسليم المنتجات.	1	2	3	4 5
•	توفير خدمات فعالة لما بعد البيع.	1	2	3	4 5

ج5 بالرجوع إلى السؤال **ج4** بالأعلى من فضلك حدد باستخدام المقياس المبين أدناه **أهمية الدور الذي تلعبه معلومات المحاسبة الإدارية** في الأولويات الاستراتيجية للشركة.

	غير هام 1	قليل الأهمية 2	متوسط الأهمية 3	عالي الأهمية 4	هام جـــــداً 5
أ.	أولويات إستراتيجية القيادة (الريادة) في التكلفة	1	2	3	4 5
ب.	أولويات إستراتيجية التميز في المنتج	1	2	3	4 5

الجزء(د):- الخصائص التنظيمية والإدارية والبيئية.

السؤالان د1 و د2 بالأسفل: يتعلقان بالبناء التنظيمي للشركة (المركزية في اتخاذ القرارات و إضفاء الطابع الرسمي).

د1 العبارات التالية تتعلق ببيئة العمل الداخلية للشركة، باستخدام المقياس المبين أدناه من فضلك حدد **إلى أي مدى تفوض الإدارة العليا صلاحية اتخاذ القرارات** التالية إلى مديري الإدارات الوسطى/التشغيلية *(الرجاء وضع دائرة حول الإجابات المناسبة)*.

	لا تفوض إطلاقاً 1	نادراً تفوض 2	أحياناً تفوض 3	غالباً تفوض 4	دائماً تفوض 5
قرارات تقديم منتجات جديدة.	1	2	3	4	5
قرارات تطوير منتجات حالية.	1	2	3	4	5
قرارات تسعير المنتجات.	1	2	3	4	5
قرارات تتعلق بإجراء تغييرات جوهرية للعمليات مثل إدخال تكنولوجيا تصنيع حديثة.	1	2	3	4	5
قرارات تتعلق بتطوير أسواق قائمة.	1	2	3	4	5

قرارات تتعلق بالموارد البشرية مثل سياسات التوظيف والتدريب والترقية والحوافز.	1	2	3	4	5
قرارات تتعلق بدخول أسواق جديدة.	1	2	3	4	5
قرارات تتعلق بالاستثمار الرأسمالي مثل بناء مصانع أو إنشاء خطوط إنتاجية جديدة.	1	2	3	4	5

د2 باستخدام المقياس المبين أدناه, من فضلك حدد **إلى أي مدى تنطبق** العبارات التالية على الشركة فيما يتعلق **بقواعد وإجراءات ودليل العمل** *(الرجاء وضع دائرة حول الإجابات المناسبة).*

لا تنطبق إطلاقاً 1	**تنطبق إلى مدى بسيط 2**	**تنطبق إلى مدى متوسط 3**	**تنطبق إلى مدى ملحوظ 4**	**تنطبق إلى مدى كبير 5**	
المديرون لديهم سياسات وإجراءات في حالة حدوث شيء غير اعتيادي يمكن إتباعها للتعامل معه.	1	2	3	4	5
جميع قواعد وإجراءات العمل عادة ما تكون مكتوبة.	1	2	3	4	5
يتم متابعة المديرين للتأكد من تطبيقهم للإجراءات المعتمدة.	1	2	3	4	5
يتم أحياناً اللجوء إلى اتفاق غير رسمي للتعامل مع مواقف معينة.	1	2	3	4	5
تفرض عقوبات صارمة لمخالفة الإجراءات المعتمدة.	1	2	3	4	5

السؤال د3 بالأسفل: يتعلق بدرجة عدم التأكد للبيئة المحيطة من وجهة نظر المديرين بالشركة.

د3 باستخدام المقياس المبين أدناه, من فضلك حدد **إلى أي مدى يمكن التنبؤ** بالعناصر التالية **من قبل المديرين** في الشركة *(الرجاء وضع دائرة حول الإجابات المناسبة).*

لا يمكن التنبؤ إطلاقاً 1	**يمكن التنبؤ إلى مدى بسيط 2**	**يمكن التنبؤ إلى مدى متوسط 3**	**يمكن التنبؤ إلى مدى ملحوظ 4**	**يمكن التنبؤ إلى مدى كبير 5**	
توفر المواد الخام (الأولية).	1	2	3	4	5
أسعار المواد الخام (الأولية).	1	2	3	4	5
احتياجات وأذواق العملاء.	1	2	3	4	5
طلب السوق.	1	2	3	4	5
أنشطة المنافسين على مستوى السوق.	1	2	3	4	5
تكنولوجيا الإنتاج والمعلومات.	1	2	3	4	5
لوائح وسياسات الدولة والمؤسسات الحكومية.	1	2	3	4	5
التغيرات الخاصة بالصناعة.	1	2	3	4	5
البيئة الاقتصادية (مثل التضخم، سوق العمل، معدل النمو).	1	2	3	4	5

الأسئلة من د4 إلى د6 بالأسفل: تتعلق بتكنولوجيا التصنيع في الشركة.

د4 من فضلك ضع علامة [✓] أمام الإجابة المناسبة التي **تصف العملية الإنتاجية** للشركة.

[ ] حسب الطلب [ ] تجميع [ ] دفعة [ ] مستمر

[ ] أخرى *(الرجاء حدد)*.....

د5 من فضلك ضع علامة [✓] أمام الإجابات المناسبة لتحديد **أي من الأساليب الإنتاجية** التالية مستخدمة حاليا في الشركة.

- الأسلوب التقليدي- نظام إنتاج غير متقدم. [ ]
- أسلوب الإنتاج في الوقت المحدد (JIT). [ ]
- أسلوب التصنيع المرن (FMS). [ ]
- أسلوب إدارة الجودة الشاملة (TQM). [ ]
- أخري (الرجاء حدد)..... [ ]

د6 فيما يتعلق بمستوى تعقيد عملية التصنيع, من فضلك حدد باستخدام المقياس المبين أدناه **إلى أي مدى تنطبق** العبارات التالية على الشركة **فيما يتعلق بتنوع المنتجات** *(الرجاء وضع دائرة حول الإجابات المناسبة).*					
لا تنطبق إطلاقاً 1	**تنطبق إلى مدى بسيط 2**	**تنطبق إلى مدى متوسط 3**	**تنطبق إلى مدى ملحوظ 4**		**تنطبق إلى مدى كبير 5**
تتنوع المنتجات المصنعة من قبل الشركة من ناحية المتطلبات التكنولوجية.	1	2	3	4	5
يوجد اختلاف كبير و ملحوظ في حجم الدفعة للمنتجات المصنعة.	1	2	3	4	5
تستخدم عمليات مختلفة ومتعددة ضمن خطوط الإنتاج لتصنيع المنتجات.	1	2	3	4	5
تحدث التغيرات في حجم الإنتاج بشكل مستمر.	1	2	3	4	5
تختلف نسبة استهلاك كل منتج لموارد الإدارات الخدمية الأخرى (غير الإنتاجية).	1	2	3	4	5

الجزء(هـ): نظام الإدارة والرقابة في الشركة (التصميم والفاعلية).

السؤال هـ1 بالأسفل: يتعلق بمحددات التصميم الناجح لنظام الإدارة والرقابة.

هـ1 باستخدام المقياس المبين أدناه, من فضلك حدد **إلى أي مدى تنطبق** العبارات التالية على الشركة *(الرجاء وضع دائرة حول الإجابات المناسبة).*					
لا تنطبق إطلاقا 1	**تنطبق إلى مدى بسيط 2**	**تنطبق إلى مدى متوسط 3**	**تنطبق إلى مدى ملحوظ 4**		**تنطبق إلى مدى كبير 5**
نظام الإدارة والرقابة موجود أساسا لضمان نجاح تنفيذ الاستراتيجية.	1	2	3	4	5
نظام الإدارة والرقابة المطبق حاليا ملائم للشركة بشكل كبير.	1	2	3	4	5
يتوقف نجاح نظام الإدارة والرقابة على جودة تصميمه.	1	2	3	4	5
تلعب الحوافز والمكافآت التشجيعية دوراً مهماً لنجاح نظام الإدارة والرقابة.	1	2	3	4	5
يتوقف نجاح نظام الإدارة والرقابة على مدى التزام الإدارة العليا.	1	2	3	4	5
يصمم نظام الإدارة والرقابة ليكون قابلاً للتكيف مع التغير في الظروف.	1	2	3	4	5
تعتبر معلومات المحاسبة الإدارية معلومات حيوية لنظام الإدارة والرقابة.	1	2	3	4	5

السؤال هـ2 بالأسفل: يتعلق بكيفية تحفيز ومراقبة وتوجيه وترشيد الأنشطة (المهام) في الشركة.

هـ2 باستخدام المقياس المبين أدناه, من فضلك حدد **إلى أي مدى تنطبق** العبارات التالية على الشركة *(الرجاء وضع دائرة حول الإجابات المناسبة).*					
لا تنطبق إطلاقا 1	**نادرا تنطبق 2**	**تنطبق أحيانا 3**	**عادة تنطبق 4**		**دائما تنطبق 5**
لدى المديرون درجة عالية من حرية التصرف والاستقلالية في اتخاذ القرارات والاستجابة للتحديات أو الفرص الجديدة.	1	2	3	4	5
يتم متابعة ورصد قرارات المديرين وإجراءاتهم على أساس مستمر بدلا من التركيز على تحقيق النتائج والأهداف المرجوة.	1	2	3	4	5
تتدفق المعلومات من أسفل وأعلى الهيكل التنظيمي بواسطة قنوات اتصال رسمية مثل الاجتماعات والتقارير.	1	2	3	4	5
يتم تقييم أداء الشركة في أي فترة من الفترات من خلال مقارنة نتائج تلك الفترة مع نتائج المنافسين في نفس الصناعة.	1	2	3	4	5
يتم تقديم تفسيرات مكتوبة للتغييرات الجوهرية بين نتائج العام الحالي ونتائج السنوات السابقة.	1	2	3	4	5
يتم إعداد التقارير الرسمية عن نسب إنجاز و تحقيق الأهداف (مثل تقارير الإدارة ، وتقارير الأداء الشهري)	1	2	3	4	5
يتم تحديد أهداف المديرين والإجراءات اللازمة لتحقيقها بشكل دقيق.	1	2	3	4	5
يتم توصيل وتعميم القواعد والسياسات والإجراءات والأهداف المكتوبة بشكل رسمي على جميع الموظفين.	1	2	3	4	5
يتم متابعة أهداف المديرين وطرق إنجازها بشكل مستمر خلال السنة.	1	2	3	4	5

يتم تحليل الانحرافات في الموازنة وبيان أسبابها لضمان تنفيذ العمليات بكفاءة وفاعلية.	1	2	3	4	5
يتم إجراء تقييم رسمي لأداء المديرين على أساس دوري.	1	2	3	4	5
يتم تطبيق النظم واللوائح في جميع أنحاء الشركة بشكل موحد وبدون تحيز لتفادي المعاملة بشكل فردي والتفضيلات الشخصية للموظفين والمديرين.	1	2	3	4	5
يتم إعداد تقارير رسمية تربط المخرجات بالمدخلات المستخدمة (مثل تكاليف كل وحدة، الوحدات المنتجة لكل ساعة عمل).	1	2	3	4	5
يتم مكافأة المديرين ماديا لتحقيقهم وإنجازهم الأهداف المكلفين بها بكفاءة وفاعلية.	1	2	3	4	5
يتم مكافأة المديرين معنويا لتحقيقهم وإنجازهم الأهداف المكلفين بها بكفاءة وفاعلية.	1	2	3	4	5

الأسئلة من هـ3 إلى هـ5 بالأسفل: تتعلق بنجاح الشركة وفاعلية نظام الإدارة والرقابة.

هـ3 من فضلك ضع علامة [✓] أمام إجابة واحدة فقط لتحدد أي من مؤشرات الأداء التالية عادة ما تستخدم للحكم على فاعلية نظام الإدارة والرقابة.

- من خلال مؤشرات الأداء المالية فقط. [ ]
- من خلال مؤشرات الأداء الغير مالية فقط. [ ]
- من خلال مزيج من المؤشرات المالية والغير مالية. [ ]

هـ4 باستخدام المقياس المبين أدناه, من فضلك حدد **إلى أي مدى تستخدم** الشركة مؤشرات الأداء التالية لقياس النجاح التنظيمي للشركة *(الرجاء وضع دائرة حول الإجابات المناسبة)*.

لا تستخدم إطلاقا 1	**تستخدم إلى مدى بسيط 2**	**تستخدم إلى مدى متوسط 3**	**تستخدم إلى مدى ملحوظ 4**	**تستخدم إلى مدى كبير 5**
الأرباح من التشغيل	1	2	3	4 5
التدفقات النقدية من العمليات	1	2	3	4 5
الربح إلى نسبة المبيعات	1	2	3	4 5
معدل العائد على الاستثمار	1	2	3	4 5
معدل نمو المبيعات	1	2	3	4 5
الحصة السوقية	1	2	3	4 5
تطوير السوق	1	2	3	4 5
تطوير منتجات جديدة	1	2	3	4 5
برامج تخفيض التكلفة	1	2	3	4 5
تطوير الموظفين	1	2	3	4 5
أنشطة البحوث والتطوير	1	2	3	4 5
المساهمة في الأنشطة الاجتماعية	1	2	3	4 5

هـ5 بالإضافة إلى مؤشرات الأداء المذكورة في السؤال **هـ4** بالأعلى, من فضلك حدد **إلى أي مدى تستخدم** الشركة أيضا مقاييس الأداء المقارن الخارجية **للحكم على فاعلية** نظام الإدارة والرقابة لديها *(الرجاء وضع دائرة حول الإجابات المناسبة)*.

لا تستخدم إطلاقا 1	**تستخدم إلى مدى بسيط 2**	**تستخدم إلى مدى متوسط 3**	**تستخدم إلى مدى ملحوظ 4**	**تستخدم إلى مدى كبير 5**
المقارنة مع المنافسين المباشرين.	1	2	3	4 5
المقارنة مع المتوسطات الخاصة بالصناعة.	1	2	3	4 5
المقارنة مع شركات تنتمي إلى صناعات أخرى.	1	2	3	4 5

الجزء(و):- معلومات المحاســـــــبة الإداريـــــــة.

الأسئلة من و1 إلى و4 بالأسفل: تتعلق بخصائص معلومات المحاسبة الإدارية في الشركة (الشمولية، والوقتية، والتجميع، و الترابط).

من فضلك حدد باستخدام المقياسين المبينين أدناه **مدى أهمية وتوفر** كل مفردة من المفردات التالية **لأغراض أنشطة التخطيط والرقابة وحل المشكلات** في الشركة *(الرجاء وضع دائرة حول الإجابات المناسبة).*

غير مهم/غير متوفر	مهم قليلا/متوفر قليلا	متوسط الأهمية/متوسط التوفر	مهم/متوفر	مهم جدا/متوفر جدا
1	2	3	4	5

و1 الشمـــــــــولـية

مدى الأهمـــــــــــية					و	مدى التوفـــــــــــر				
5	4	3	2	1	المعلومات التي تتعلق بالأحداث الداخلية والممكن حدوثها مستقبلا مثل المشروعات الرأسمالية الجديدة.	5	4	3	2	1
5	4	3	2	1	المعلومات غير المالية التي تتعلق بالعملية الإنتاجية مثل معدلات مخرجات الإنتاج ومستويات الخردة, وكفاءة الآلات وإنتاجية الموظفين.	5	4	3	2	1
5	4	3	2	1	تفسير الأحداث المستقبلية في شكل أرقام (التقديرات المحتملة).	5	4	3	2	1
5	4	3	2	1	معلومات عن عوامل خارجية للشركة واسعة التأثير مثل الظروف الاقتصادية, النمو السكاني.	5	4	3	2	1
5	4	3	2	1	معلومات تتعلق بأحداث خارجية متوقع حدوثها مستقبلا مثل تغير أذواق العملاء, تهديدات تنافسية, التطورات في تكنولوجيا التصنيع, مواقف الدولة وهيأت حماية المستهلكين.	5	4	3	2	1
5	4	3	2	1	المعلومات غير المالية التي تتعلق بأسواق المنتجات مثل حجم السوق و معدلات النمو.	5	4	3	2	1

و2 الوقتية والتقرير عن المعلومات

مدى الأهمـــــــــــية					و	مدى التوفـــــــــــر				
5	4	3	2	1	معلومات تمكن المديرين من تنظيم ومراقبة الأنشطة تكون جاهزة بمجرد طلبهم لها.	5	4	3	2	1
5	4	3	2	1	المعلومات ذات العلاقة يزود المديرون بها تلقائيا بمجرد وصولها لنظم المعلومات أو عند الانتهاء من معالجتها وتجهيزها.	5	4	3	2	1
5	4	3	2	1	تقدم التقارير باستمرار للمديرين على أساس منظم وبشكل دوري مثل التقارير اليومية والتقارير الأسبوعية.	5	4	3	2	1
5	4	3	2	1	لا يوجد تأخير بين وقوع حدث معين- مثل تحركات المنافسين أو طلب السوق- والمعلومات ذات العلاقة التي تقدم إلى المديرين.	5	4	3	2	1

و3 التجميع

مدى الأهمـــــــــــية					و	مدى التوفـــــــــــر				
5	4	3	2	1	معلومات عن مختلف الوظائف أو الأقسام في الشركة مثل الإنتاج والتسويق والمبيعات والتكاليف ومراكز الربحية.	5	4	3	2	1
5	4	3	2	1	معلومات عن تأثير الأحداث على فترات زمنية معينة مثل شهرية أو ربع سنوية أو الملخصات السنوية أو المؤشرات والمقارنات.	5	4	3	2	1
5	4	3	2	1	معلومات عن تأثير أحداث معينة على مختلف الوظائف (كالإنتاج أو التسويق) المرتبطة بأنشطة أو مهام ما.	5	4	3	2	1
5	4	3	2	1	معلومات عن أثر الأنشطة المختلفة للأقسام على ملخص التقارير مثل الأرباح والتكاليف وتقارير إيرادات الأقسام الأخرى.	5	4	3	2	1
5	4	3	2	1	معلومات مقدمة في صورة تصلح كمدخلات لنماذج اتخاذ القرارات مثل تحليل التدفقات النقدية وتحليل المخزون وتحليل السياسات الائتمانية.	5	4	3	2	1
5	4	3	2	1	معلومات في شكل تمكن المديرين من إجراء تحليل "ماذا لو؟".	5	4	3	2	1

و4 الترابط

مدى الأهمـــــــــــية					و	مدى التوفـــــــــــر				
5	4	3	2	1	معلومات عن الأهداف المحددة لجميع أنشطة الأقسام داخل الشركة.	1	2	3	4	5
5	4	3	2	1	معلومات عن أثر قرارات الآخرين على ما يقع في إطار مسؤوليتك.	1	2	3	4	5
5	4	3	2	1	معلومات عن تأثير قراراتك على أقسام الشركة الأخرى.	1	2	3	4	5
5	4	3	2	1	معلومات عن أثر قراراتك على الأداء العام للشركة.	1	2	3	4	5

الرجاء وضع علامة[✓] إذا كنت ترغب في الحصول على النتائج النهائية لهذه الدراسة [ ]

من أجل تحقيق أهداف هذه الدراسة وتحسين جودة البيانات، **أرغب في القيام بمقابلات شخصية مع بعض المجيبين لهذا الاستبيان،** ربما خلال **شهر 2010/07 ف**. مساعدتك ستكون محل تقدير وامتنان. **إذا كنت ترغب في أن أجري معك مقابلة، الرجاء تعبئة البيانات أدناه:**

أسم الشركة: .....

أسمك: .....

رقم هاتفك: .....

بريدك الإلكتروني: .....

أرجو استخدام الجزء التالي لأي ملاحظات إضافية

شكرا جزيلا على مساعدتك في تعبئة الاستبيان. نحن نرحب بأي ملاحظات أو اقتراحات تود أن تبديها حول أي قضية ذكرت في الاستبيان. يمكنك استخدام الجزء المخصص أدناه، أو استخدام صفحة أخرى إضافية وأرفقها مع الاستبيان المعبأ أو بشكل منفصل.

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